

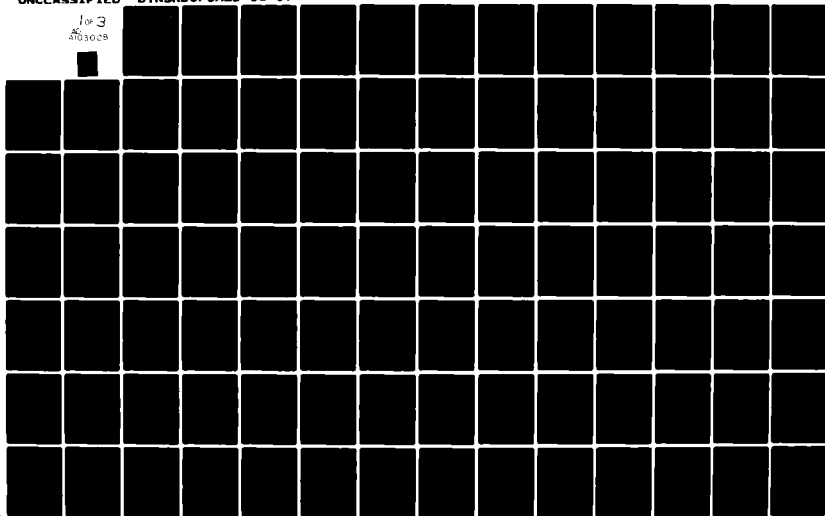
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DAVID W TAYLOR NAVAL SHIP RESEARCH AND DEVELOPMENT CE--ETC F/G 9/2  
COMPUTER CENTER CDC LIBRARIES/NSRDC (SUBPROGRAMS). (U)  
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CMLD-81-07

Computer Center CDC Libraries/NSRDC (Subprograms)

**DAVID W. TAYLOR NAVAL SHIP  
RESEARCH AND DEVELOPMENT CENTER**

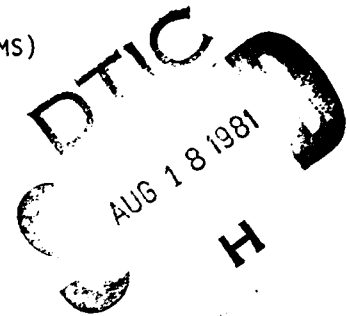
Bethesda, Maryland 20084



COMPUTER CENTER  
CDC LIBRARIES/NSRDC (SUBPROGRAMS)

by

David V. Sommer



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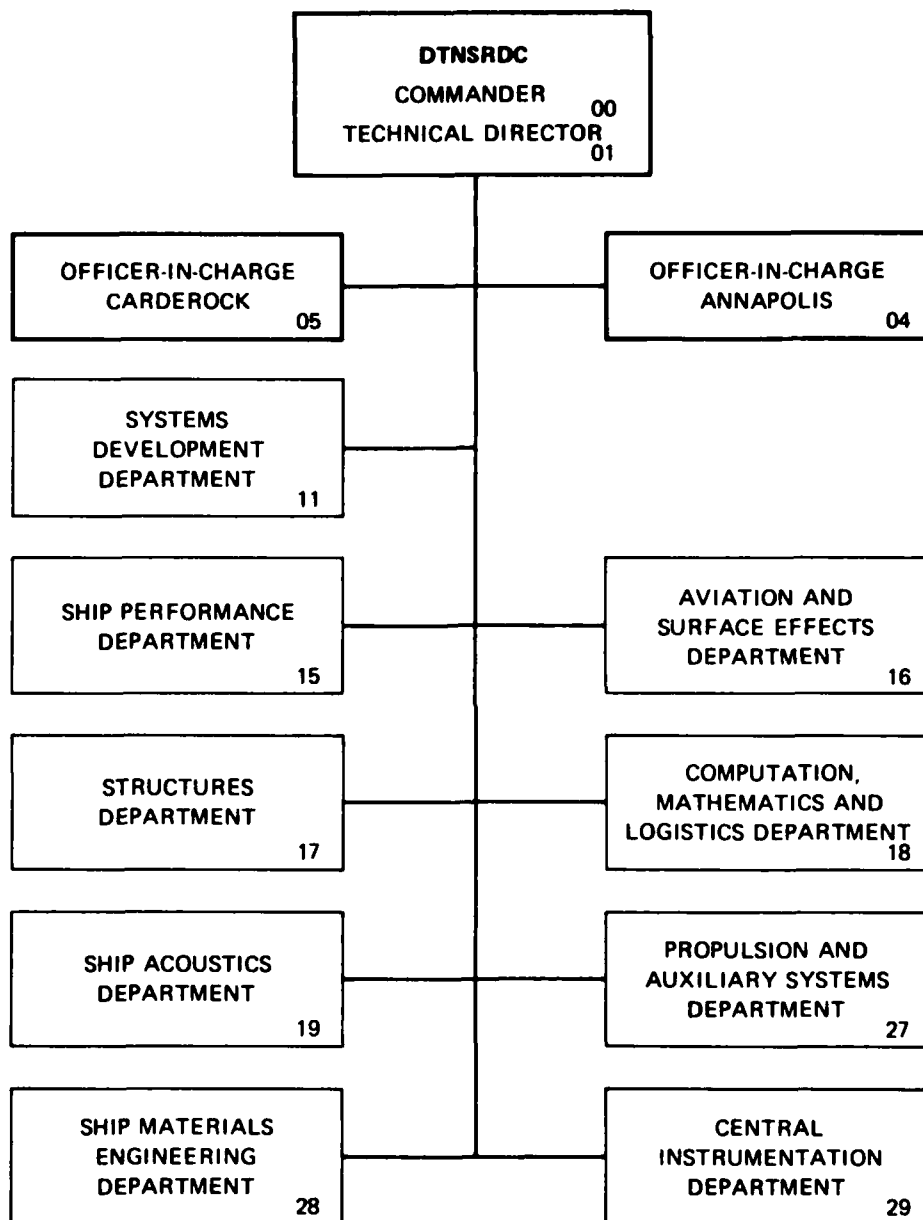
Computation, Mathematics and Logistics Department  
Departmental Report

February 1981

CMLD-81-07

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## MAJOR DTNSRDC ORGANIZATIONAL COMPONENTS



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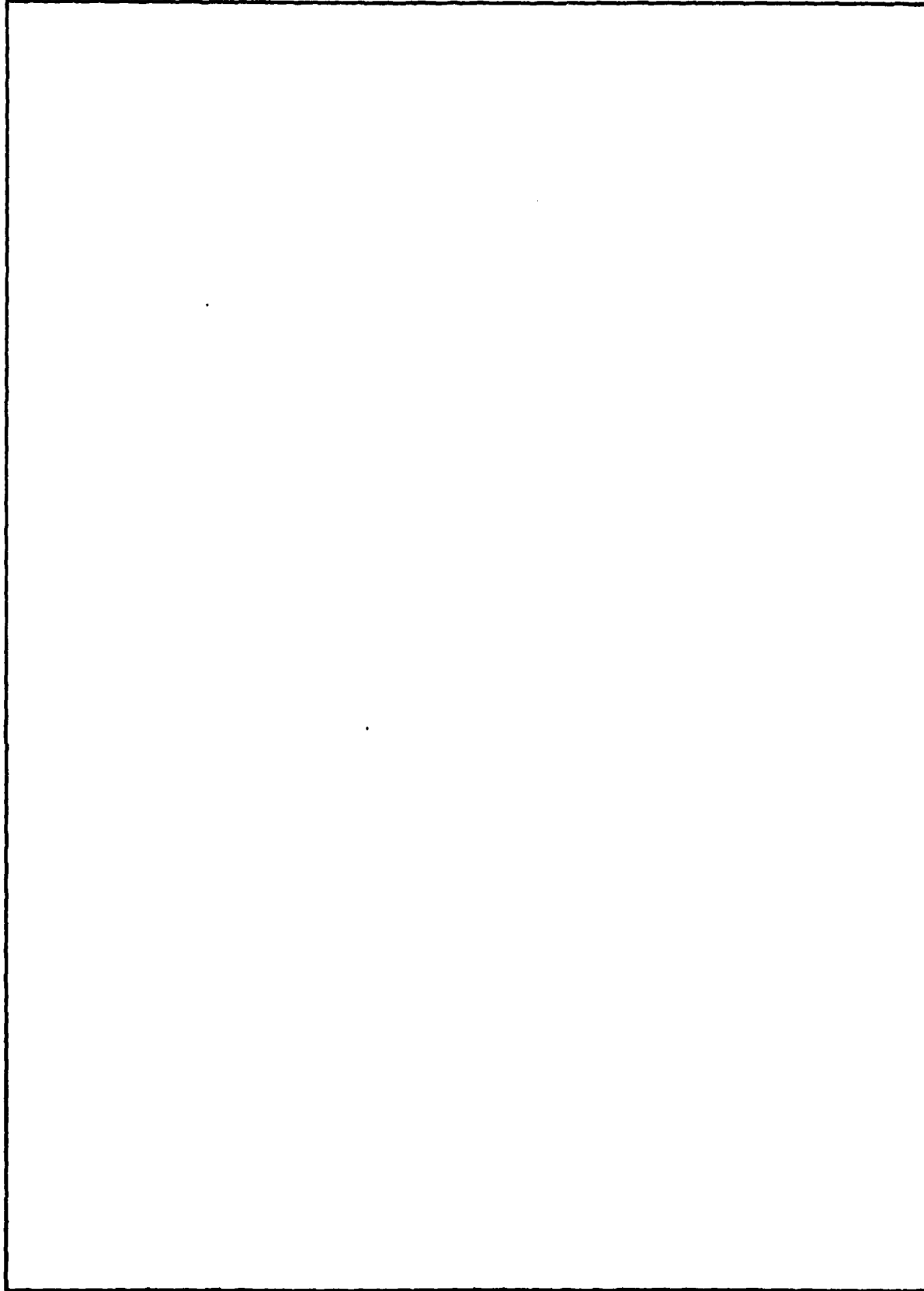
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*          COMPUTER CENTER
*        CDC LIBRARIES / NSRDC
*        (SUBPROGRAMS)
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\* - A LISTING OF THE DOCUMENTS IS NOT INCLUDED IN THIS TABLE OF CONTENTS (SEE PAGE 1-9). AS NEW ROUTINES ARE DEVELOPED, THEY WILL BE INSERTED ALPHABETICALLY INTO THIS DOCUMENT AND MAY BE PRINTED ON THE COMPUTER.

## \*\*\*\*\* INTRODUCTION \*\*\*\*\*

THE COMPUTER CENTER MAKES AVAILABLE ON THE CDC COMPUTERS, IN ADDITION TO THE NOS/BE OPERATING SYSTEM, A WIDE VARIETY OF BOTH SCIENTIFIC AND UTILITY PROGRAMS, SUBPROGRAMS AND CATALOGUED PROCEDURES. MOST OF THE ROUTINES ARE MAINTAINED IN LIBRARIES ON PERMANENT FILES AND MAY BE INVOKED BY THE APPROPRIATE (LOADER) CONTROL CARDS.

THE CLIB-SERIES OF MANUALS CONSISTS OF THE FOLLOWING, WHICH DESCRIBE THE CONTENTS OF THE VARIOUS CDC 6000 LIBRARIES MAINTAINED BY THE COMPUTER CENTER:

CLIB	- COMPUTER CENTER CDC LIBRARIES	CMLD-81-06
CLIB/N	- COMPUTER CENTER CDC LIBRARIES/NSRDC (SUBPROGRAMS)	CMLD-81-07
CLIB/P	- COMPUTER CENTER CDC LIBRARIES/PROCFIL (PROCEDURES)	CMLD-81-08
CLIB/U	- COMPUTER CENTER CDC LIBRARIES/UTILITY (PROGRAMS)	CMLD-81-09
CLIB/M	- COMPUTER CENTER CDC LIBRARIES/MNSRDC (PROGRAMS)	

THIS MANUAL, CLIB/N, IS A REFERENCE MANUAL WHICH DESCRIBES MOST OF THE SUBPROGRAMS IN LIBRARY 'NSRDC'.

## \*\*\* HOW TO USE THIS MANUAL \*\*\*

THE ROUTINES ARE CLASSIFIED IN ONE OR MORE FUNCTIONAL CATEGORIES (SEE PAGE 1-2 FOR A LIST OF CATEGORIES). THEY ARE LISTED, BEGINNING ON PAGE 1-5, UNDER THE VARIOUS CATEGORIES. THE INDIVIDUAL ROUTINES ARE LISTED, WITH DESCRIPTIVE TITLE, BEGINNING ON PAGE 1-8. CHAPTER 2 CONTAINS ALL CURRENTLY AVAILABLE MACHINE-READABLE DOCUMENTS DESCRIBING THE USE OF SUBPROGRAMS IN LIBRARY 'NSRDC'. DOCUMENTATION NOT IN CHAPTER 2 MAY BE OBTAINED FROM USER SERVICES, CARDEROCK, BLDG 17, ROOM 100, (202) 227-1907.

## \*\*\* LIBRARY NSRDC \*\*\*

'NSRDC' IS A LIBRARY OF DTNSRDC WRITTEN AND/OR SUPPORTED SUBPROGRAMS. THESE ROUTINES ARE USED PRIMARILY WITH FTN, MNF OR RATFOR PROGRAMS AND MOST ARE CODED IN FTN.

## \*\*\* USING THE LIBRARY \*\*\*

THE FOLLOWING CONTROL CARDS MAY BE USED TO ACCESS 'NSRDC' DURING THE LOADING OF A PROGRAM:

```
...
FTN.    -OR-  COBOL.    -OR-  ATTACH,LGO,MYLGO,ID=XXXX.
ATTACH,NSRDC.
LDSET,LIB=NSRDC.    -OR-  LIBRARY,NSRDC.
LGO.
...
```



## \*\*\* FUNCTIONAL CATEGORIES \*\*\*

THE FOLLOWING FUNCTIONAL CATEGORIES ARE USED AT DTNSRDC. THOSE CATEGORIES PRECEDED BY AN ASTERISK (\*) ARE LOCAL DTNSRDC CATEGORIES. THE OTHER ARE FROM THE VIM (CDC USERS GROUP) LIST.

- A0 ARITHMETIC ROUTINES
- A1 REAL NUMBERS
- A2 COMPLEX NUMBERS
- A3 DECIMAL
- A4 I/O ROUTINES
  
- B0 ELEMENTARY FUNCTIONS
- B1 TRIGONOMETRIC
- B2 HYPERBOLIC
- B3 EXPONENTIAL AND LOGARITHMIC
- B4 ROOTS AND POWERS
  
- C0 POLYNOMIALS AND SPECIAL FUNCTIONS
- C1 EVALUATION OF POLYNOMIALS
- C2 ROOTS OF POLYNOMIALS
- C3 EVALUATION OF SPECIAL FUNCTIONS (NON-STATISTICAL)
- C4 SIMULTANEOUS NON-LINEAR ALGEBRAIC EQUATIONS
- C5 SIMULTANEOUS TRANSCENDENTAL EQUATIONS
- \* C6 ROOTS OF FUNCTIONS
  
- D0 OPERATIONS ON FUNCTIONS AND SOLUTIONS OF DIFFERENTIAL EQUATIONS
- D1 NUMERICAL INTEGRATION
- D2 NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS
- D3 NUMERICAL SOLUTIONS OF PARTIAL DIFFERENTIAL EQUATIONS
- D4 NUMERICAL DIFFERENTIATION
  
- E0 INTERPOLATION AND APPROXIMATIONS
- E1 TABLE LOOK-UP AND INTERPOLATION
- E2 CURVE FITTING
- E3 SMOOTHING
- E4 MINIMIZING OR MAXIMIZING A FUNCTION
  
- F0 OPERATIONS ON MATRICES, VECTORS & SIMULTANEOUS LINEAR EQUATIONS
- F1 VECTOR AND MATRIX OPERATIONS
- F2 EIGENVALUES AND EIGENVECTORS
- F3 DETERMINANTS
- F4 SIMULTANEOUS LINEAR EQUATIONS
  
- G0 STATISTICAL ANALYSIS AND PROBABILITY
- G1 DATA REDUCTION (COMMON STATISTICAL PARAMETERS)
- G2 CORRELATION AND REGRESSION ANALYSIS
- G3 SEQUENTIAL ANALYSIS
- G4 ANALYSIS OF VARIANCE
- G5 TIME SERIES
- G6 SPECIAL FUNCTIONS (INCLUDES RANDOM NUMBERS AND PDF'S)
- \* G7 MULTIVARIATE ANALYSIS AND SCALE STATISTICS
- \* G8 NON-PARAMETRIC METHODS AND STATISTICAL TESTS
- \* G9 STATISTICAL INFERENCE

H0 OPERATIONS RESEARCH TECHNIQUES, SIMULATION & MANAGEMENT SCIENCE  
H1 LINEAR PROGRAMMING  
H2 NON-LINEAR PROGRAMMING  
H3 TRANSPORTATION AND NETWORK CODES  
H4 SIMULATION MODELING  
H5 SIMULATION MODELS  
H6 CRITICAL PATH PROGRAMS  
H8 AUXILIARY PROGRAMS  
H9 COMBINED

I0 INPUT  
I1 BINARY  
I2 OCTAL  
I3 DECIMAL  
I4 BCD (HOLLERITH)  
I9 COMPOSITE

J0 OUTPUT  
J1 BINARY  
J2 OCTAL  
J3 DECIMAL  
J4 BCD (HOLLERITH)  
J5 PLOTTING  
J7 ANALOG  
J9 COMPOSITE

K0 INTERNAL INFORMATION TRANSFER  
K1 EXTERNAL-TO-EXTERNAL  
K2 INTERNAL-TO-INTERNAL (RELOCATION)  
K3 DISK  
K4 TAPE  
K5 DIRECT DATA DEVICES

L0 EXECUTIVE ROUTINES  
L1 ASSEMBLY  
L2 COMPILING  
L3 MONITORING  
L4 PREPROCESSING  
L5 DISASSEMBLY AND DERELATIVIZING  
L6 RELATIVIZING  
L7 COMPUTER LANGUAGE TRANSLATORS

M0 DATA HANDLING  
M1 SORTING  
M2 CONVERSION AND/OR SCALING  
M3 MERGING  
M4 CHARACTER MANIPULATION  
M5 SEARCHING, SEEKING, LOCATING  
M6 REPORT GENERATORS  
M9 COMPOSITE

N0 DEBUGGING  
N1 TRACING AND TRAPPING  
N2 DUMPING  
N3 MEMORY VERIFICATION AND SEARCHING  
N4 BREAKPOINT PRINTING

O0 SIMULATION OF COMPUTERS AND DATA PROCESSORS (INTERPRETERS)  
O1 OFF-LINE EQUIPMENT (LISTERS, REPRODUCERS, ETC.)  
O3 COMPUTERS  
O4 PSEUDO-COMPUTERS  
O5 SOFTWARE SIMULATION OF PERIPHERALS  
O9 COMPOSITE

P0 DIAGNOSTICS (HARDWARE MALFUNCTION)

Q0 SERVICE OR HOUSEKEEPING, PROGRAMMING AIDS  
Q1 CLEAR/RESET  
Q2 CHECKSUM ACCUMULATION AND CORRECTION  
Q3 REWIND, TAPE MARK, LOAD CARDS, LOAD TAPE PROGRAMS, ETC.  
Q4 INTERNAL HOUSEKEEPING, SAVE, RESTORE, ETC.  
Q5 REPORT GENERATOR SUBROUTINES  
Q6 PROGRAM DOCUMENTATION: FLOW CHARTS, DOCUMENT, STANDARDIZATION  
Q7 PROGRAM LIBRARY UTILITIES

R0 LOGIC AND SYMBOLIC  
R1 FORMAL LOGIC  
R2 SYMBOL MANIPULATION  
R3 LIST AND STRING PROCESSING  
R4 TEXT EDITING

S0 INFORMATION RETRIEVAL

T0 APPLICATIONS AND APPLICATION-ORIENTED PROGRAMS  
T1 PHYSICS (INCLUDING NUCLEAR)  
T2 CHEMISTRY  
T3 OTHER PHYSICAL SCIENCES (GEOLOGY, ASTRONOMY, ETC.)  
T4 ENGINEERING  
T5 BUSINESS DATA PROCESSING  
T6 MANUFACTURING (NON-DATA) PROCESSING AND PROCESS CONTROL  
T7 MATHEMATICS AND APPLIED MATHEMATICS  
T8 SOCIAL AND BEHAVIORAL SCIENCES AND PSYCHOLOGY  
T9 BIOLOGICAL SCIENCES  
T10 REGIONAL SCIENCES (GEOGRAPHY, URBAN PLANNING)  
T11 COMPUTER ASSISTED INSTRUCTION

U0 LINGUISTICS AND LANGUAGES

V0 GENERAL PURPOSE UTILITY SUBROUTINES  
V1 RANDOM NUMBER GENERATORS  
V2 COMBINATORIAL GENERATORS: PERMUTATIONS, COMBINATIONS & SUBSETS  
\* V3 STANDARD AND SPECIAL PROBLEMS

X0 DATA REDUCTION  
X1 RE-FORMATTING, DECOMMUTATION, ERROR DIAGNOSIS  
X2 EDITING  
X3 CALIBRATION  
X4 EVALUATION  
X5 ANALYSIS (TIME-SERIES ANALYSIS)  
X6 SIMULATION (GENERATE TEST DATA FOR DATA REDUCTION SYSTEM)

Y0 INSTALLATION MODIFICATION  
Y1 INSTALLATION MODIFICATION LIBRARY  
Y2 NEWPL TAPE OF INSTALLATION MODIFICATIONS

Z0 ALL OTHERS

## \*\*\* LIST OF SUBPROGRAMS BY CATEGORY \*\*\*

THE SUBPROGRAMS IN LIBRARY 'NSRDC' ARE LISTED BELOW UNDER THEIR FUNCTIONAL CATEGORIES. ROUTINES FLAGGED WITH AN ASTERISK (\*) DO NOT HAVE MACHINE-READABLE DOCUMENTATION. AN ALPHABETICAL LIST, WITH A BRIEF DESCRIPTION OF EACH ROUTINE BEGINS ON PAGE 1-8.

A0 ARITHMETIC ROUTINES			
ICOMN *			
A1 REAL NUMBERS			
ISUMIT	NFILL	SUMIT	
A2 COMPLEX NUMBERS			
CMPINV	HELP	PSI	*
B1 TRIGONOMETRIC			
COTAN			*
B4 ROOTS AND POWERS			
DPROOT	PROOT		
C1 EVALUATION OF POLYNOMIALS			
APOWR *	POLDIV *	PROD2	*
BPOWR *	POWR1 *		
HIFAC *	POWR2 *		
C2 ROOTS OF POLYNOMIALS			
DPROOT	NROOTS *	QUART	*
HELP	PROOT		
C3 EVALUATION OF SPECIAL FUNCTIONS (NON-STATISTICAL)			
AI *	CBSF *	EXPINT *	
BEJY0 *	CEI3 *	FRESNEL	
BEJY1 *	CELLI	GAMCAR	
BESSI	COMBES *	GAMMA	
BESSJ	ELLI *	LOGGAM *	
BESSK	ELLIP *	PSI *	
BESSY	ERF *	SNCNDN	
BSJ	ERROR *		
C6 ROOTS OF FUNCTIONS			
ROOTER *			
D1 NUMERICAL INTEGRATION			
FGI *	QUADG	SIMPUN	
FNOL3 *	SIMP *	XFIL *	
D2 NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS			
FNOL3 *	KUTMER		
E1 TABLE LOOK-UP AND INTERPOLATION			
CRDTAB *	FRMRAN *		
DISCOT	FRMRA2 *		

E2	CURVE FITTING		
	FFT	OPLSA	SPLFIT *
	FFT5	POLYN	SQFIT *
	GMHAS *	RFFT	
	LSQSUB *	RFSN	
E3	SMOOTHING		
	SMOOTH *		
E4	MINIMIZING OR MAXIMIZING A FUNCTION		
	MINMAX *		
F1	VECTOR AND MATRIX OPERATIONS		
	MATINS		
F2	EIGENVALUES AND EIGENVECTORS		
	VARAH1 *	VARAH2 *	
F3	DETERMINANTS		
	GAUSS	MATINS	
F4	SIMULTANEOUS LINEAR EQUATIONS		
	BMAM *	GAUSS	MATINS
	CGAUSS	MAM *	
	CMPINV	MAM200 *	
G1	DATA REDUCTION (COMMON STATISTICAL PARAMETERS)		
	STUTEE *		
G4	ANALYSIS OF VARIANCE		
	ANOVA1 *	ANOVA2 *	
G6	SPECIAL FUNCTIONS (INCLUDES RANDOM NUMBERS AND PDF'S)		
	IAOC	IDAYWEK	RANNUM *
I0	INPUT		
	FASTIN *		
I2	OCTAL		
	OFMTDE	OFMTV	
I3	DECIMAL		
	CRDTAB *		
I4	BCD (HOLLERITH)		
	ICOM *	ICOMN *	IFMTV
J2	OCTAL		
	PRTFL		

J4	BCD (HOLLERITH)		
	BANR	ICOMN *	PRTIME
	BANR6	LINE6	
	ICOM *	LINE8	
J5	PLOTTING		
	PLOTMY *	PLOTPR	PLOTXY *
K2	INTERNAL-TO-INTERNAL (RELOCATION)		
	GETRA	MOVEIT	SWAP
	MFETCH	MSET	
	MOVECM	RCPA	
M0	DATA HANDLING		
	COMPSTR	MASKIT	
	EQU60	SWAP	
M1	SORTING		
	ASORT	QSORT1	SSORTI
	ASORTMV	SSORT	SSORTL
	QSORT	SSORTF	
M2	CONVERSION AND/OR SCALING		
	DATCNV	IROMAN	NEWDAT
	DATFMT	ISEC	UNHEX3
	GETHOUR	JGDATE	WEKDAY
	HEX3	JULIAN	
	IHMS	MONTH	
M4	CHARACTER MANIPULATION		
	ADJL	IBUNP	REPLNE
	ADJR	IPAKLFT	SBYT
	ASHIFT	ISTAPE	SEMICO
	CENTER	LBYT	SETREW
	CHFILL	LEFTADJ	SHIFTA
	CHNGSEQ	MOVCHAR	SKWEZL
	CONTRCT	MOVSTR	SKWEZR
	EXPAND	MXGET	TRAILBZ
	EXPRM	PARGET	VALDAT
	EXTBIT	PUTCHA	VFILL
	EXTPRM	PUTCHR	ZBLANK
	FBINRD	REPLAC	ZEROFL
	GETCHA	REPLACM	ZEROS
	GETCHR	REPLHI	
	GETPRM *	REPLLO	
M5	SEARCHING, SEEKING, LOCATING		
	AMAXE	GETCHR	LASTWRD
	AMINE	GETLIB	MAXE
	FINDC	IDIGIT	MINE
	FINDW	IFINDCH	NFILLT
	FINDWRD	LASTC	NUMVAR
	GETCHA	LASTCH	VALIDT
NO	DEBUGGING		
	ALTIME	ELTIME	PRTIME

N2	DUMPING		
	DMPA	DUMPA	DUMPFL
	DMPCPA	DUMPCPA	RECOVRD
O1	OFF-LINE EQUIPMENT (LISTERS, REPRODUCERS, ETC.)		
	WARNING		
Q0	SERVICE OR HOUSEKEEPING, PROGRAMMING AIDS		
	AC	GETLIB	NUMEXEC
	ALTIME	GODROP	NUMVAR
	BANR	HERE	OVLNAME
	BANR6	IBL	PFR
	BUFSIZE	IDID	PRTFL
	ELTIME	ISITCNF	REDUCE
	FTNRFL	JOBNAME	ROUTERC
	GETFIT	JOBORG	TIMLEFT
	GETLFNS	MEMUSED	ZPFPUT
	GETLGO	MFRAME	ZRTPUT
Q3	FILE MANIPULATION		
	CLUNLD	ROUTE	ZPFUNC
	REQUEST	UNLOAD	ZSYSEQ
Q4	INTERNAL HOUSEKEEPING, SAVE, RESTORE, ETC.		
	PRTIME		
R1	FORMAL LOGIC		
	COUPLE		
T4	ENGINEERING		
	ARDCFT *		
V1	RANDOM NUMBER GENERATORS		
	RANNUM *	RNDMIZ	

## \*\*\* DESCRIPTIVE TITLES \*\*\*

SUBPROGRAMS IN LIBRARY 'NSRDC' ARE LISTED ALPHABETICALLY BELOW.

AC	GET ACCOUNT NUMBER FOR THIS JOB
ADJL	LEFT ADJUST A LINE OF WORDS LEAVING ONE SPACE BETWEEN WORDS
ADJR	RIGHT ADJUST A LINE OF WORDS LEAVING ONE SPACE BETWEEN WORDS
AI	AIRY FUNCTION INTEGRAL
ALTIME	OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE START OF JOB (OR INTERCOM SESSION)
AMAXE	FIND MAXIMUM VALUE OF AN ARRAY (ALSO CONTAINS MAXE)
AMINE	FIND MINIMUM VALUE OF AN ARRAY (ALSO CONTAINS MINE)
ANOVA1	ONE-WAY ANALYSIS OF VARIANCE WITH UNEQUAL N
ANOVA2	TWO-WAY ANALYSIS OF VARIANCE WITH EQUAL N
APOWR	EXPONENTIATION OF POWER SERIES - ONE VARIABLE
ARDCFT	PROPERTIES OF U.S. STANDARD ATMOSPHERE (1962)
ASHIFT	SHIFT EACH WORD OF AN ARRAY
ASORT	FTN ALPHANUMERIC SORT
ASORTMV	SORT 2-DIMENSIONAL ARRAY USING A FAST ARRAY MOVING SUBROUTINE
BANR	PRINT A BANNER (LETTERS ARE 10 LINES HIGH, LINES ARE 110 CHARACTERS LONG)
BANR6	PRINT A BANNER (LETTERS ARE 6 LINES HIGH, LINES ARE 80 CHARACTERS LONG)
BEJY0	ZERO-ORDER BESSEL FUNCTIONS FOR REAL ARGUMENTS
BEJY1	FIRST ORDER BESSEL FUNCTIONS FOR REAL ARGUMENTS
BESSI	MODIFIED BESSEL FUNCTION OF THE FIRST KIND
BESSJ	BESSEL FUNCTION OF THE FIRST KIND
BESSK	MODIFIED BESSEL FUNCTION OF THE SECOND KIND
BESSY	BESSEL FUNCTION OF THE SECOND KIND



BMAN	SOLVE SYSTEM $AX=B$ FOR BANDED SYMMETRIC MATRICES
BPOWR	EXPONENTIATION OF POWER SERIES IN TWO VARIABLES
BSJ	SPHERICAL BESSEL FUNCTION
BUFSIZE	PRINT MESSAGE IN DAYFILE FOR EACH FILE SPECIFIED INDICATING BUFFER SIZE AND WHETHER BUFFER IS CURRENTLY ALLOCATED
CBSF	COMPLEX BESSEL FUNCTION FOR LARGE ARGUMENT
CCALL	EXIT PROGRAM AND EXECUTE ONE OR MORE CONTROL CARD
CEI3	COMPLETE ELLIPTIC INTEGRAL OF THE THIRD KIND
CELLI	COMPLETE AND INCOMPLETE ELLIPTIC INTEGRALS OF THE FIRST AND SECOND KIND
CENTER	CENTER A CHARACTER STRING WITHIN AN OUTPUT FIELD
CFILL	FILL AREA WITH ALTERNATING FIELDS OF SPECIFIED CHARACTER AND BLANKS
CGAUSS	COMPLEX SOLUTION OF SIMULTANEOUS EQUATIONS AND DETERMINANT BY ITERATIVE GAUSSIAN ELIMINATION
CHFILL	FILL (PORTION OF) AN ARRAY WITH A CHARACTER
CHNGSEQ	ALLOW COBOL4 USER TO DEFINE A COLLATING SEQUENCE
CLUNLD	CLOSE AND UNLOAD A FILE
CMPINV	COMPLEX MATRIX INVERSION
COMBES	BESSEL FUNCTIONS FOR COMPLEX ARGUMENT AND ORDER
COMPSTR	COMPARE TWO CHARACTER STRINGS
CONTRCT	SQUEEZE ARRAY OF 1R-FORMAT CHARACTERS TO LEFT (SEE EXPAND)
COTAN	COTANGENT FUNCTION
COUPLE	LOGICALLY CONNECT TWO WORDS
CRDTAB	READ TABLES FOR FRMRAN AND FRMRA2 INTERPOLATION
DATCNV	CONVERT DATE FORMATS (USES INTEGERS)
DATFMT	CONVERT DATE FORMATS (USES CHARACTER STRINGS)
DISCOT	SINGLE OR DOUBLE INTERPOLATION
DMP4	CALLABLE OCTAL AND CHARACTER DUMP OF SPECIFIED PORTION OF USER'S FIELD LENGTH (FL) (BY ACTUAL LOCATION) (NO HEADINGS ARE PROVIDED)

DMPCPA	DUMP JOB CONTROL POINT AREA
DPROOT	FIND ALL ROOTS OF A REAL DOUBLE PRECISION POLYNOMIAL
DUMPA	GIVE OCTAL AND CHARACTER DUMP OF USER-SPECIFIED AREA
DUMPCPA	EXPANDED DUMP OF JOB CONTROL POINT AREA
DUMPFL	CALLABLE OCTAL AND CHARACTER DUMP OF SPECIFIED PORTION OF USER'S FIELD LENGTH (FL) (BY ACTUAL LOCATION)
ELLI	ELLIPTIC INTEGRAL
ELLIP	ELLIPTIC INTEGRAL
ELTIME	OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE LAST CALL TO ELTIME
EQU60	LOGICAL COMPARE OF TWO ARRAYS
ERROR	ERROR FUNCTION
EXPAND	EXPAND CHARACTER STRING INTO ARRAY OF 1R-FORMAT WORDS (SEE CONTRCT)
EXPINT	EXPONENTIAL INTEGRAL
EXPRM	EXTRACT NEXT PARAMETER FROM EXECUTE CARD
EXTBIT	EXTRACT BITS FROM A WORD
EXPRM	EXTRACT NEXT PARAMETER FROM USER-SUPPLIED PARAMETER STRING
FASTIN	READ AND UNPACK DATA PREPARED ON THE XDS-910 A/D CONVERSION SYSTEM
FBINRD	UNPACK AN INPUT ARRAY (N BITS PER INPUT CHARACTER INTO CDC WORD)
FFT	FAST FOURIER TRANSFORM FOR COMPLEX TABULATED FUNCTION
FFT5	FAST FOURIER TRANSFORM
FGI	FORTAN GAUSSIAN INTEGRATION
FINDC	FIND PRESENCE OR ABSENCE OF SPECIFIED CHARACTER IN AN ARRAY (USER SPECIFIES RELATIONAL OPERAND)
FINDW	FIND PRESENCE OR ABSENCE OF SPECIFIED WORD IN AN ARRAY (USER SPECIFIES RELATIONAL OPERAND)
FINDWRD	FIND SPECIFIED WORD IN AN ARRAY
FNOL3	INTEGRATE SYSTEM OF ORDINARY DIFFERENTIAL EQUATIONS

FRESNEL	EVALUATE FRESNEL INTEGRALS
FRMRAN	LINEAR TABLE INTERPOLATION (ONE OR TWO INDEPENDENT VARIABLES)
FRMRA2	LINEAR TABLE INTERPOLATION (MULTIPLE INDEPENDENT VARIABLES)
FTNRFL	GET/SET CORE SIZE
GAMCAR	COMPLEX GAMMA FUNCTION OF A COMPLEX ARGUMENT HAVING POSITIVE REAL PART
GAMMA	INCOMPLETE OR COMPLETE GAMMA FUNCTION
GAUSS	SIMULTANEOUS EQUATION SOLUTION WITH DETERMINANT BY ITERATIVE GAUSSIAN ELIMINATION
GETCHA	EXTRACT CHARACTER FROM SPECIFIED POSITION IN AN ARRAY
GETCHR	EXTRACT CHARACTER FROM SPECIFIED POSITION IN A WORD
GETFIT	GET SPECIFIED FIT ADDRESS
GETHOUR	FOR A SPECIFIED PERIOD OF TIME (UP TO 2 HR 59 MIN 59 SEC) DETERMINE WHICH HOUR IS OCCUPIED THE LONGEST
GETLFNS	GET ACTUAL LOCAL FILE NAMES (FOR FTN)
GETLGO	EXTRACT FIRST 10 CHARACTERS OF ALL EXECUTE CARD PARAMETERS
GETLIB	GET SYSTEM LIBRARY NAME FROM CODE IN CONTROL POINT AREA
GETRA	GET PROGRAM COMMUNICATION REGION (RA+0 THRU RA+77B)
GMHAS	HARMONIC ANALYSIS
GODROP	ISSUE USER-SPECIFIED GO/DROP MESSAGE
HELP	COMPLEX ZEROES OF REAL OR COMPLEX POLYNOMIAL
HERE	GET TERMINAL ID FOR THIS JOB
HEX3	SQUEEZE 3-CHARACTER HEX INTO 12 BITS
HIFAC	HIGHEST COMMON FACTOR OF TWO POLYNOMIALS
IAOC	COUNT ONE-BITS IN SPECIFIED WORD
IBL	CALCULATE BEST BLOCK LENGTH (MIN TIME REQ'D FOR RANDOM ACCESS AND MINIMUM BUFFER SIZE) FOR INDEX SEQUENTIAL FILES
IBUNP	UNPACK 12-BIT BYTES FROM ARRAY

ICOM	INTERACTIVE COMMUNICATOR (SYMBOLIC) -- READ RESPONSE AND COMPARE WITH LIST OF VALID RESPONSES
ICOMN	INTERACTIVE COMMUNICATOR (INTEGER NUMERIC) -- READ NUMBER AND TEST TO SEE IF IN SPECIFIED RANGE
IDAYWEK	FUNCTION TO DETERMINE THE DAY OF THE WEEK FOR ANY DATE FROM 10/15/1582 THRU 02/28/4000
IDID	GET USER INITIALS (AND INTERCOM USER ID) FROM CHARGE CARD OR LOGIN
IDIGIT	CHECK FOR DIGITS IN A FIELD WITHIN A WORD
IFINDCH	FIND FIRST OCCURRENCE OF SPECIFIED CHARACTER IN ARRAY
IFMTV	FAST I-FORMAT DECODE OF VARIABLE LENGTH INPUT
IHMS	CONVERT SECONDS TO ' HH.MM.SS.' (SEE ISEC)
IPAKLFT	SQUEEZE LEFT AND REMOVE ZEROS (00B) AND BLANKS (55B), RETURN NUMBER OF CHARACTERS
IROMAN	CONVERT ROMAN NUMBERS TO INTEGER
ISEC	CONVERT HH.MM.SS TO SECONDS (SEE IHMS)
ISITCNF	TEST FOR CONNECTED FILE
ISTAPE	GENERATE TAPE NAME 'TAPENN'
ISUMIT	SUM ELEMENTS OF INTEGER ARRAY
JGDATE	CONVERT ANY GREGORIAN DATE TO A JULIAN DATE AND VICE VERSA (MULTI-YEAR)
JOBNAME	GET NOS/BE JOB NAME FOR THIS JOB
JOBORG	GET JOB ORIGIN (BATCH, INTERCOM, GRAPHICS, MULTI-USER)
JULIAN	CONVERT ANY GREGORIAN DATE TO A JULIAN DATE AND VICE VERSA (SINGLE YEAR)
KUTMER	INTEGRATE A SYSTEM OF FIRST-ORDER ORDINARY DIFFERENTIAL EQUATIONS USING THE KUTTA-MERSON FOURTH-ORDER, SINGLE-STEP METHOD
LASTCH	FIND LAST NON-BLANK CHARACTER IN ARRAY
LASTWRD	FIND LAST WORD OF ARRAY WHICH CONTAINS A NON-BLANK CONTAINS A NON-BLANK
LBYT	EXTRACT VARIABLE LENGTH BYTE

LEFTADJ SQUEEZE LEFT AND REMOVE BLANKS AND OOB (USER MAY SUPPLY TRAILING FILL CHARACTER)

LINE6 SET PRINT FILE TO 6 LINES PER INCH

LINE8 SET PRINT FILE TO 8 LINES PER INCH

LOGGAM LOGARITHM OF GAMMA FUNCTION FOR COMPLEX ARGUMENT

LSQSUB GENERAL WEIGHTED LEAST SQUARES FIT

MAM SOLVE SYMMETRIC SYSTEM OF LINEAR EQUATIONS

MAM200 SOLVE 200 SYMMETRIC LINEAR EQUATIONS

MASKIT DYNAMIC MASK GENERATOR

MATINS MATRIX INVERSE WITH SIMULTANEOUS EQUATION SOLUTION AND DETERMINANT

MAXE FIND MAXIMUM VALUE OF AN ARRAY (ALSO CONTAINS AMAXE)

MEMUSED PRINT MESSAGE IN DAYFILE GIVING FIELD LENGTH IN USE AT TIME OF CALL TO THIS ROUTINE

MFETCH FETCH A SINGLE WORD FROM USER'S FL (SEE MSET)

MFRAME OBTAIN THE MACHINE AND MAINFRAME RUNNING THE PROGRAM

MINE FIND MINIMUM VALUE OF AN ARRAY (ALSO CONTAINS AMINE)

MINMAX GENERALIZED NONLINEAR ITERATOR

MONTH FROM A DATE (MM/DD/YY) FIND THE MONTH AND RETURN FULL SPELLING AND 3- OR 4-CHARACTER ABBREVIATION

MOVCHAR MOVE ONE CHARACTER FROM ONE STRING TO ANOTHER

MOVECM MOVE WORDS FROM ONE AREA IN CORE TO ANOTHER

MOVEIT MOVE AN ARRAY (MOVLEV REPLACEMENT WHICH CALLS MOVECM)

MOVSTR MOVE A STRING OF CHARACTERS FROM ONE ARRAY TO ANOTHER

MSET SET A SINGLE WORD IN USER'S FL (SEE MFETCH)

MXGET EXTRACT (RIGHT-JUSTIFIED, ZERO-FILLED) 0-10 6-BIT CHARACTERS FROM 60-BIT WORDS

NEWDAT ADD/SUBTRACT SPECIFIED NUMBER OF DAYS TO/FROM A GIVEN DATE

NFILL FILL ELEMENTS 1 THRU N OF AN ARRAY WITH THE VALUES 1 THRU N, RESPECTIVELY

NFILLT TEST AN ARRAY FOR THE PRESENCE OF THE INTEGERS 1 THRU N IN ELEMENTS 1 THRU N, RESPECTIVELY

NROOTS	REAL AND COMPLEX ROOTS OF REAL POLYNOMIAL
NUMEXEC	GET NUMBER OF EXECUTE CARD PARAMETERS WHICH WERE USED IN THIS EXECUTION OF THE PROGRAM
NUMVAR	DETERMINE NUMBER OF ARGUMENTS IN CALL TO SUBPROGRAM
OFMTDE	FAST O-FORMAT DECODE
OFMTV	FAST O-FORMAT DECODE OF VARIABLE LENGTH INPUT
OPLSA	ORTHOGONAL POLYNOMIAL LEAST SQUARE APPROXIMATION
OVLNAME	GET NAME OF FILE CURRENTLY BEING EXECUTED
PARGET	GET ALL PARAMETERS OF USER-SUPPLIED PARAMETER STRING
PFRC	SUPPLY DESCRIPTION OF PERMANENT FILE FUNCTION RETURN CODE
PLOTMY	PRINTER PLOT - MULTIPLE CURVES
PLOTPR	PRINTER PLOT - MULTIPLE CURVES
PLOTXY	PRINTER PLOT - SINGLE CURVE
POLDIV	POLYNOMIAL DIVISION
POLYN	LEAST SQUARES POLYNOMIAL FIT
POWR1	1 TERM IN EXPONENTIATION OF POWER SERIES - ONE VARIABLE
POWR2	1 TERM IN EXPONENTIATION OF POWER SERIES - TWO VARIABLES
PROD2	1 TERM IN PRODUCT OF POWER SERIES - TWO VARIABLES
PROOT	FIND ALL ROOTS OF A REAL PLOYNOMIAL
PRTFL	PRINT CURRENT FL (OR PUT INTO DAYFILE)
PRTIME	GET AND PRINT CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE LAST CALL AND PRINT USER-SUPPLIED MESSAGE
PSI	COMPLEX PSI FUNCTION
PUTCHA	INSERT CHARACTER INTO SPECIFIED POSITION IN AN ARRAY
PUTCHR	INSERT CHARACTER INTO SPECIFIED POSITION IN A WORD
QSORT	IN-CORE ASCENDING SORT FOR ARRAYS LARGER THAN 500 WORDS
QSORT1	IN-CORE ASCENDING SORT WITH RE-ORDERING OF ASSOCIATED ARRAY (FOR ARRAYS LARGER THAN 500 WORDS)
QUADG	INTEGRAL BY GAUSS-LEGENDRE 10-POINT QUADRATURE
QUART	REAL OR COMPLEX ROOTS OF QUARTIC

RANUM	NORMALLY DISTRIBUTED RANDOM NUMBERS
RCPA	READ (A PORTION OF) CONTROL POINT AREA
RECOVRD	ON RECOVERY, PRINT EXCHANGE JUMP PACKAGE, RA+0 THRU RA+77B
REDUCE	REDUCE FL TO MINIMUM -OR- REQUEST ADDITIONAL FL RELATIVE TO START OF BLANK COMMON
REPLAC	REPLACE ONE CHARACTER WITH ANOTHER IN AN ARRAY
REPLACM	REPLACE SEVERAL CHARACTERS WITH OTHER CHARACTERS
REPLHI	REPLACE ALL CHARACTERS GREATER THAN SPECIFIED CHARACTER WITH NEW CHARACTER
REPLLO	REPLACE ALL CHARACTERS LESS THAN SPECIFIED CHARACTER WITH NEW CHARACTER
REPLNE	REPLACE ALL CHARACTERS (EXCEPT SPECIFIED CHARACTER) WITH A SPECIFIED CHARACTER
REQUEST	CALLABLE REQUEST COMMAND
RFFT	FAST FOURIER TRANSFORM FOR REAL TABULATED DATA
RFSN	REVERSE FAST FOURIER TRANSFORM
RNDMIZ	EMULATE BASIC LANGUAGE 'RANDOMIZE' STATEMENT (CAN BE USED TO GUARANTEE FIRST CALL TO RANF WILL RESULT IN A DIFFERENT NUMBER WITH EACH EXECUTION OF A PROGRAM)
ROOTER	GENERAL ROOT FINDER
ROUTE	CALLABLE ROUTE COMMAND
ROUTERC	SUPPLY DESCRIPTION OF ROUTE RETURN CODE
SBYT	STORE VARIABLE LENGTH BYTE
SEMICO	REPLACE DISPLAY CODE 00B WITH 77B (SEMI-COLON)
SETREW	CONVERT ALPHABETIC REWIND OPTION INTO RM OPEN AND CLOSE CODES
SHIFTA	SHIFT ARRAY A SPECIFIED NUMBER OF BITS (CROSSING OVER WORD BOUNDARIES)
SIMP	SIMPSON'S RULE INTEGRATION
SIMPUN	SIMPSON'S RULE INTEGRATION - UNEQUAL INTERVALS
SKWEZL	SQUEEZE LEFT AND REMOVE BLANKS AND 00B
SKWEZR	SQUEEZE RIGHT AND REMOVE BLANKS AND 00B

SMOOTH	LEAST SQUARES POLYNOMIAL SMOOTHING
SNCNDN	JACOBIAN ELLIPTIC FUNCTION
SPLFIT	SPLINE CURVE FIT
SQFIT	POLYNOMIAL LEAST SQUARE FIT
SSORT	FTN SHELL SORT
SSORTF	FTN CALLABLE SHELL SORT FOR TWO-DIMENSIONAL ARRAYS
SSORTI	FTN CALLABLE SHELL SORT FOR TWO-DIMENSIONAL ARRAYS
SSORTL	FTN LOGICAL SHELL SORT
STUTEE	STUDENT'S T DISTRIBUTION
SUMIT	SUM ELEMENTS OF REAL ARRAY
SWAP	SWAP TWO ARRAYS
TIMLEFT	DETERMINE CP (AND IO) TIME LEFT SINCE START OF BATCH JOB OR INTERCOM COMMAND
TRAILBZ	CHANGE TRAILING BLANKS TO ZEROS (00B)
UNHEX3	SPREAD 2 CHARACTERS INTO 3 HEX DIGITS
UNLOAD	UNLOAD A FORTRAN FILE
VALDAT	LOGICAL FUNCTION TO VALIDATE A DATE FORMAT
VALIDT	VALIDATE AN ARRAY TO SEE THAT EACH ELEMENT IS ONE OF A USER-SPECIFIED LIST
VARAH1	EIGENVALUES AND EIGENVECTORS OF A GENERAL REAL MATRIX
VARAH2	IMPROVED ESTIMATES AND BOUNDS FOR EIGENSYSTEM OF A GENERAL REAL MATRIX
VFILL	FILL AN ARRAY WITH USER-SPECIFIED WORD
WARNING	FTN-CALLABLE 'WARNING' CONTROL CARD
WEKDAY	DETERMINE THE DAY OF THE WEEK FOR ANY GREGORIAN DATE FROM OCTOBER 15, 1582 THRU FEBRUARY 28, 4000
XFIL	FILON'S METHOD FOR INTEGRALS WITH SIN AND COS
ZBLANK	CHANGE BLANKS TO 00B AND VICE VERSA
ZEROFL	ZERO FIELD LENGTH (SECURITY EOJ)
ZEROS	REPLACE BLANKS WITH (DISPLAY CODE) ZEROS, MULTIPLE FIELDS



ZPFPUT	PUT USER-SPECIFIED PARAMETERS INTO ARRAY FOR LATER CALL TO ZPFUNC
ZPFUNC	CALLABLE PERMANENT FILE FUNCTIONS
ZRTPUT	PUT USER-SPECIFIED PARAMETERS INTO ARRAY FOR LATER CALL TO ROUTE
ZSYSEQ	FORTRAN CALLABLE SYSTEM CALL

## \*\*\*\*\* SUBPROGRAM DOCUMENTATION \*\*\*\*\*

THIS CHAPTER CONTAINS THE MACHINE-READABLE DOCUMENTATION FOR MANY SUBPROGRAMS IN LIBRARY 'NSRDC'. NON-MACHINE-READABLE DOCUMENTATION FOR OTHER ROUTINES IN THE LIBRARY IS ON FILE IN USER SERVICES, CODE 1892.1, (202) 227-1907.

## \*\*\* HOW TO PRINT A DOCUMENT \*\*\*

INDIVIDUAL DOCUMENTS MAY BE PRINTED USING:

BEGIN.DOCGET,,NSRDC,,<SUBPROG>.OUTPUT.

WHERE <SUBPROG> IS THE DESIRED DOCUMENT.

SEVERAL DOCUMENTS MAY BE PRINTED AT ONE TIME USING:

```
JOBNAME.  
CHARGE,.....  
BEGIN,UTILITY,,MANYDOC.NSRDC.  
' 7/8/9      EOR  
<SUBPROG1>  
<SUBPROG2>  
  
      .  
<SUBPROGN>  
" 6/7/8/9    EOI
```

SUBROUTINE 'AC'  
FUNCTION 'AC'

PURPOSE  
GET ACCOUNT NUMBER FOR THIS JOB

FUNCTIONAL CATEGORIES: Q0

USAGE  
CALL AC (I)  
IVARIABLE = AC (I)

DESCRIPTION OF PARAMETERS  
AC - WILL CONTAIN ACCOUNT NUMBER  
(INTEGER TYPE VARIABLE)  
I - WILL ALSO CONTAIN ACCOUNT NUMBER

REMARKS  
'AC' MUST BE DECLARED INTEGER IN THE CALLING ROUTINE.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
NONE  
OTHERS  
RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS  
L71FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

LANGUAGE: FORTRAN IV

METHOD  
THE ACCOUNT NUMBER IS TAKEN FROM CONTROL POINT AREA.

CM REQUIRED: 37B

AUTHOR  
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/04/75

DATE(S) REVISED  
02/27/76

LOCATION OF DECKS  
SOURCE  
UPDATE LIBRARY: NSRDCPL.ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'ADJL'

PURPOSE

LEFT ADJUST A LINE OF WORDS LEAVING ONE SPACE BETWEEN WORDS

FUNCTIONAL CATEGORIES: M4

USAGE

CALL ADJL (A, NA, NC, NW, NWORDS)

DESCRIPTION OF PARAMETERS

A - ARRAY CONTAINING WORDS TO BE LEFT-ADJUSTED  
(WILL BE REPLACED BY LEFT-ADJUSTED ARRAY)  
NA - NUMBER OF COMPUTER WORDS IN 'A' (DIMENSION OF 'A')  
NC - OUTPUT NUMBER OF CHARACTERS  
NW - OUTPUT NUMBER OF COMPUTER WORDS  
(SUBSCRIPT OF LAST NON-BLANK WORD IN 'A')  
NWORDS - OUTPUT NUMBER OF WORDS IN LINE

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

GETCHA - GET CHARACTER FROM ARRAY  
PUTCHA - PUT CHARACTER INTO ARRAY

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 147B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/24/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'ADJR'

PURPOSE

RIGHT ADJUST A LINE OF WORDS LEAVING ONE SPACE BETWEEN WORDS

FUNCTIONAL CATEGORIES: M4

USAGE

CALL ADJR (A, NA, NC, NW, NWORDS)

DESCRIPTION OF PARAMETERS

A - ARRAY CONTAINING WORDS TO BE RIGHT-ADJUSTED  
(WILL BE REPLACED BY RIGHT-ADJUSTED ARRAY)  
NA - NUMBER OF COMPUTER WORDS IN 'A' (DIMENSION OF 'A')  
NC - OUTPUT POSITION OF FIRST NON-BLANK CHARACTER  
NW - OUTPUT SUBSCRIPT OF FIRST NON-BLANK WORD IN 'A'  
NWORDS - OUTPUT NUMBER OF WORDS IN LINE

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

GETCHA - GET CHARACTER FROM ARRAY  
PUTCHA - PUT CHARACTER INTO ARRAY

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 157B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/24/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,1D=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'ALTIME'

PURPOSE

OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE  
START OF JOB (OR INTERCOM SESSION)

FUNCTIONAL CATEGORIES: Q0 NO

USAGE

CALL ALTIME (TIMES)

DESCRIPTION OF PARAMETER

TIMES - 7-WORD ARRAY TO CONTAIN THE FOLLOWING:

- 1 - CPA TIME IN SECONDS
- 2 - CPB TIME IN SECONDS
- 3 - CP TIME IN SECONDS (CPA+CPB)
- 4 - PP TIME IN SECONDS
- 5 - IO TIME IN SECONDS
- 6 - WALL CLOCK TIME ( HH.MM.SS. )
- 7 - WALL CLOCK TIME IN SECONDS

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

- ISEC - CONVERT HH.MM.SS TO SECONDS
- RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS

R65FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

LANGUAGE: FORTRAN IV

CM REQUIRED: 60B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/15/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'ASHIFT'

PURPOSE

SHIFT EACH INDIVIDUAL WORD OF AN ARRAY

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

SEE 'SHIFTA' TO SHIFT AN ENTIRE ARRAY.

USAGE

CALL ASHIFT (A, NA, NABITS)

DESCRIPTION OF PARAMETERS

A - ARRAY, EACH WORD OF WHICH IS TO BE SHIFTED  
NA - NUMBER OF WORDS IN 'A' TO BE SHIFTED  
NABITS - NUMBER OF BITS TO SHIFT EACH WORD  
POSITIVE -- SHIFT LEFT CIRCULAR  
NEGATIVE -- SHIFT RIGHT WITH SIGN PROPAGATION

CM REQUIRED: 17B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 1973

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'ASORT'

## PURPOSE

FTN ALPHANUMERIC SORT

FUNCTIONAL CATEGORIES: M1

## USAGE

```
CALL ASORT (A, I, L, TEM, PT, COL, KEY, TRANA, KEYM)
CALL ASORT (A, I, L, TEM, PT, COL, KEY, 0, KEYM)
CALL ASORT (A, I, L, TEM, PT, COL, KE, TRANA)
CALL ASORT (A, I, L, TEM, PT, COL, KEY)
CALL ASORT (A, I, L, TEM, PT, COL)
```

## DESCRIPTION OF PARAMETERS

A - TWO-DIMENSIONAL ARRAY TO BE SORTED  
I - NUMBER OF COLUMNS (LINES) TO BE SORTED  
L - NUMBER OF ROWS (LENGTH OF LINE) PER COLUMN  
TEM - TEMPORARY WORK ARRAY OF DIMENSION 'I'  
PT - TEMPORARY WORK ARRAY OF DIMENSION 'I'  
COL - TEMPORARY WORK ARRAY OF LENGTH 'L'  
KEY - IF PRESENT, IS ARRAY OF LENGTH 'L' LISTING THE SORT KEYS:  
KEY(1)=5 IMPLIES THAT THE PRIMARY SORT KEY IS ROW 5  
KEY(2)=7 " " " SECONDARY " " " ROW 7  
KEY(N)=M " " " N-TH " " " ROW M  
KEY(N)=0 IMPLIES THAT THE SORT ENDS AFTER N-1 SORT KEYS ARE USED  
TRANA - IF PRESENT, I 63-WORD ARRAY DEFINING THE COLLATING SEQUENCE.  
IF ABSENT OR 0, DISPLAY CODE VALUES ARE USED.  
IF 0, KEYM CAN BE USED WITHOUT CHANGING THE COLLATING SEQUENCE.  
KEYM - IF PRESENT, IS AN ARRAY OF LENGTH 'L' FURTHER DEFINING THE SORT KEYS. (E.G., KEYM(2) IS A MASK DEFINING WHAT BITS OF THE SECONDARY SORT KEY WILL BE USED.)

## REMARKS

NONE

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

IABS LOCF SHIFT

OTHERS

EQU60

SENT

SSORTL

## ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 4746



AUTHOR

C FLINK - KPS - NWL

DATE WRITTEN: 03/08/71

DATE(S) REVISED

06/23/72 - C FLINK

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'ASORTMV'

## PURPOSE

SORT AN ARRAY TAKING ADVANTAGE OF A FAST ARRAY MOVE

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN IV

## COMPUTER

CDC 6000

## REMARKS

IN ORDER TO USE 'MOVECM', ALL RELATED DATA TO BE SWAPPED  
MUST BE PHYSICALLY LOCATED NEXT TO EACH OTHER, THAT IS, EACH  
ROW OF 'A' CONTAINS RELATED DATA.

## USAGE

CALL ASORTMV (A, NROW, NCOL, IROW, UPDOWN, TEMP, SWAP)

## DESCRIPTION OF PARAMETERS

A - 2-DIMENSIONAL ARRAY TO BE SORTED  
NROW - NUMBER OF ROWS IN ARRAY 'A' (FIRST DIMENSION)  
NCOL - NUMBER OF COLUMNS IN ARRAY 'A' (SECOND DIMENSION)  
IROW - ROW POSITION TO BE SORTED  
UPDOWN - SORT ORDER DESIRED  
1LA - ASCENDING SORT  
1LD - DESCENDING SORT  
TEMP - WORK ARRAY OF DIMENSION 'NROW' OR GREATER  
SWAP - RETURN CODE  
0 - NO SWAPPING WAS NECESSARY  
(ARRAY ALREADY IN ORDER)  
1 - AT LEAST 1 SWAP WAS NECESSARY  
2 - UPDOWN INVALID, ASCENDING SORT ASSUMED,  
NO SWAPPING WAS NECESSARY  
3 - UPDOWN INVALID, ASCENDING SORT ASSUMED,  
AT LEAST 1 SWAP WAS NECESSARY  
4 - IROW  $\leq$  0  
5 - IROW  $>$  NROW

CM REQUIRED: 233B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
NONE  
OTHERS  
MOVECM - MOVE AN ARRAY

AUTHOR  
DAVID V SOMMER - NSRDC CODE 1892.2

DATE WRITTEN: 02/01/75

DATE(S) REVISED  
02/21/80 - CHANGE 'MOVLEV' TO 'MOVECM'

LOCATION OF DECKS  
SOURCE  
UPDATE LIBRARY: NSRDCPL,ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'BANR'

## PURPOSE

PRINT A BANNER (LETTERS ARE 10 LINES HIGH, LINES ARE 110 CHARACTERS LONG)

FUNCTIONAL CATEGORIES: J4

LANGUAGE: FORTRAN IV

## COMPUTERS

BURROUGHS B7700  
CDC 6000

## REMARKS

UPPER CASE ONLY (A-Z 0-9 + - \* / ( ) \$ = SPACE , . #  
\$ ! : " \_ | & ' ? < > @ \ ~ ; )

EACH BANNER REQUIRED 14 LINES (4 BLANKS, 10 FOR THE BANNER).  
THUS, 3 BANNERS WILL FIT ON A PAGE AT 6 LINES PER INCH;  
5 AT 8 LPI.

UP TO 10 CHARACTERS MAY APPEAR IN A BANNER. THE LINES ARE  
110 CHARACTERS LONG.

SEE SUBROUTINE 'BANR6'.

## USAGE

CALL BANR (BANNER, IFILE, NEWPAG)

## DESCRIPTION OF PARAMETERS

BANNER - 1-10 CHARACTERS TO BE PRINTED  
(B7700 : 2-WORD REAL ARRAY;  
CDC 6000: SINGLE WORD OR ARRAY ELEMENT)  
IFILE - NUMBER OF FILE ON WHICH BANNER IS TO BE WRITTEN  
NEWPAG - ONE OF:  
ZERO - BANNER IS WRITTEN ON NEW PAGE  
NON-ZERO - BANNER IS WRITTEN ON SAME PAGE

CM REQUIRED: B7700: EST 1715 WORDS; CDC 6000: 1540B

## OUTPUT UNITS

UNIT # LFN/INT

USE

-----  
USER SPECIFIES

-----  
LISTABLE OUTPUT

## EXAMPLES

PRINT THE BANNER 'HYSTERICAL' AT THE TOP OF THE NEXT PAGE  
ON THE PRINTER FILE:

B7700 : REAL HYS(2)/ "HYSTERICAL"/  
CALL BANR (HYS, 6, 0)  
CDC 6000: CALL BANR ("HYSTERICAL", 6LOUTPUT, 0)

PRINT THE BANNER '10/19/77' ON THE SAME PAGE ON FILE 9:

B7700 : REAL DAT(2)/ "10/19/77"/  
CALL BANR (DAT, 9, 2)  
CDC 6000: CALL BANR (8H10/19/77, 9, 1)

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

B7700

NONE

CDC 6000

SHIFT

OTHERS

B7700

FOLDIT - FOLD LOWER CASE TO UPPER CASE

SCANCH - CHARACTER SCAN

CDC 6000

VFILL - FILL ARRAY WITH WORD

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/18/75

DATE(S) REVISED

79/07/16 - RE-WRITTEN FOR B7700

81/01/15 - CDC VERSION UPGRADED TO NOS/BE LEVEL 461

LOCATION OF DECKS

SOURCE

B7700 : \*SOURCE/NSRDC/BANR

CDC 6000: UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

B7700 : \*NSRDC/BANR

CDC 6000: EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'BANR6'

## PURPOSE

PRINT A BANNER (LETTERS ARE 6 LINES HIGH, LINES ARE 80 CHARACTERS LONG)

FUNCTIONAL CATEGORIES: J4

LANGUAGE: FORTRAN IV

## COMPUTERS

BURROUGHS B7700  
CDC 6000

## REMARKS

UPPER CASE ONLY (A-Z 0-9 + - \* / ( ) \$ = SPACE , . #  
! : " \_ | & ' ? < > @ \ - ;)

EACH BANNER REQUIRED 10 LINES (4 BLANKS, 6 FOR THE BANNER).  
THUS, 6 BANNERS WILL FIT ON A PAGE AT 6 LINES PER INCH:  
8 AT 8 LPI.

UP TO 10 CHARACTERS MAY APPEAR IN A BANNER. THE LINES ARE  
80 CHARACTERS LONG.

SEE SUBROUTINE 'BANR'.

## USAGE

CALL BANR6 (BANNER, IFILE, NEWPAG)

## DESCRIPTION OF PARAMETERS

BANNER - 1-10 CHARACTERS TO BE PRINTED  
(B7700 : 2-WORD REAL ARRAY;  
CDC 6000: SINGLE WORD OR ARRAY ELEMENT)  
IFILE - NUMBER OF FILE ON WHICH BANNER IS TO BE WRITTEN  
NEWPAG - ONE OF:  
ZERO - BANNER IS WRITTEN ON NEW PAGE  
NON-ZERO - BANNER IS WRITTEN ON SAME PAGE

CM REQUIRED: B7700: EST 1103 WORDS; CDC 6000: 1046B

## OUTPUT UNITS

UNIT #	LFN/INT	USE
-----	-----	-----
USER SPECIFIES		LISTABLE OUTPUT

## EXAMPLES

PRINT THE BANNER 'HYSTERICAL' AT THE TOP OF THE NEXT PAGE  
ON THE PRINTER FILE:

B7700 : REAL HYS(2)/ "HYSTERICAL"/  
CALL BANR6 (HYS, 6, 0)  
CDC 6000: CALL BANR6 ("HYSTERICAL", 6LOUTPUT, 0)

PRINT THE BANNER '10/19/77' ON THE SAME PAGE ON FILE 9:

B7700 : REAL DAT(2)/ "10/19/77"/  
CALL BANR6 (DAT, 9, 2)  
CDC 6000: CALL BANR6 (8H10/19/77, 9, 1)

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

B7700

NONE

CDC 6000

MOVLEV        SHIFT

OTHERS

B7700

FOLDIT - FOLD LOWER CASE TO UPPER CASE

SCANCH - CHARACTER SCAN

CDC 6000

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/18/77

DATE(S) REVISED

79/07/16 - RE-WRITTEN FOR B7700

LOCATION OF DECKS

SOURCE

B7700        :    \*SOURCE/NSRDC/BANR6

CDC 6000:    UPDATE LIBRARY:    NSRDCPL.ID=CSYS

OBJECT

B7700        :    \*NSRDC/BANR6

CDC 6000:    EDITLIB USER LIBRARY:    NSRDC

# SUBROUTINE 'BESSI'

## PURPOSE

MODIFIED BESSEL FUNCTION OF THE FIRST KIND

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

## REMARKS

FOR  $N=0$ ,  $I(NU)$  AND  $I(NU+1)$  ARE ALWAYS COMPUTED.

IF K-BESSEL FUNCTION IS ALSO REQUIRED, USE SUBROUTINE BESSK TO OBTAIN I- AND K-BESSEL FUNCTIONS.

## USAGE

CALL BESSI (X, FNU, N, VI)

## DESCRIPTION OF PARAMETERS

X - THE ARGUMENT ( $X > 0.0$ )  
FNU - NU, THE FRACTIONAL PART OF THE ORDER ( $0. \leq FNU \leq 1.$ )  
N - HIGHEST ORDER IS  $(N+FNU)$   
ABS(N)+1 TABLE ENTRIES ARE TO BE COMPUTED  
VI - ARRAY TO CONTAIN THE COMPUTED TABLE  
(DIMENSION MUST BE AT LEAST:  $MAX(N+13, X+28)$ , THE REST OF THE ARRAY IS WORK AREA)  
 $VI(1) = (E^{**(-X)}) I_0(X)$ , WHERE  $I_0$  IS  $I(0+FNU)$   
ETC.

CM REQUIRED: 715B

## METHOD

SEE "RECURRENCE TECHNIQUES FOR THE CALCULATION OF BESSEL FUNCTIONS", M. GOLDSTEIN AND R. THALER, MTAC, VOL. XIII, NO. 66, APRIL 1959.

FOR  $X \geq 10.0$ , ASYMPTOTIC VALUES ARE COMPUTED USING THE SO-CALLED PHASE AMPLITUDE METHOD. SEE "BESSEL FUNCTIONS FOR LARGE ARGUMENTS", M. GOLDSTEIN AND R. THALER, MTAC, VOL XII, NO. 61, JANUARY 1958.

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

ABS	EXP	IABS	MAX0	SQRT
OTHERS				
GAMMA				



AUTHORS

FLORENCE F. RAGUSA AND M. GOLDSTEIN  
HARVEY ABRAMSON  
MARGARET FRANTZ  
NEW YORK UNIVERSITY

VIM ROUTINE NYURESS

DATE WRITTEN: BEFORE 11/65

DATE(S) REVISED

11/65 - HA  
09/01/67 - MF

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED: CLIBRARYUPD3,D=HY  
(\*DECK ?)

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'BESSJ'

PURPOSE

BESSEL FUNCTION OF THE FIRST KIND

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

REMARKS

FOR  $N=0$ ,  $J(NU)$  AND  $J(NU+1)$  ARE ALWAYS COMPUTED.

IF Y-BESSEL FUNCTION IS ALSO REQUIRED, USE SUBROUTINE BESSY TO OBTAIN J- AND Y-BESSEL FUNCTIONS.

USAGE

CALL BESSJ (X, FNU, N, VJ)

DESCRIPTION OF PARAMETERS

X - THE ARGUMENT ( $X > 0.0$ )  
FNU - NU, THE FRACTIONAL PART OF THE ORDER ( $0. \leq FNU \leq 1.$ )  
N - HIGHEST ORDER IS  $(N+FNU)$   
ABS(N)+1 TABLE ENTRIES ARE TO BE COMPUTED  
VI - ARRAY TO CONTAIN THE COMPUTED TABLE  
(DIMENSION MUST BE AT LEAST:  $\text{MAX}(N+13, X+28)$ , THE  
REST OF THE ARRAY IS WORK AREA)  
VJ(1) =  $J_0(X)$ , WHERE  $J_0$  IS  $J(0+FNU)$   
ETC.

CM REQUIRED: 701B

METHOD

SEE "RECURRENCE TECHNIQUES FOR THE CALCULATION OF BESSEL FUNCTIONS", M. GOLDSTEIN AND R. THALER, MTAC, VOL. XIII, NO. 66, APRIL 1959.

FOR  $X \geq 10.0$ , ASYMPTOTIC VALUES ARE COMPUTED USING THE SO-CALLED PHASE AMPLITUDE METHOD. SEE "BESSEL FUNCTIONS FOR LARGE ARGUMENTS", M. GOLDSTEIN AND R. THALER, MTAC, VOL XII, NO. 61, JANUARY 1958.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

ABS	COS	IABS	MAX0	SIN
SQRT				
OTHERS				
GAMMA				

AUTHORS

FLORENCE F. RAGUSA AND M. GOLDSTEIN  
HARVEY ABRAMSON  
MARGARET FRANTZ  
NEW YORK UNIVERSITY

VIM ROUTINE NYUBESS

DATE WRITTEN: BEFORE 11/65

DATE(S) REVISED

11/65 - HA  
09/01/67 - MF

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED: CLIBRARYUPD3.D=HY  
(\*DECK ?)

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'BESSK'

## PURPOSE

BESSEL FUNCTION OF THE SECOND KIND

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

## REMARKS

FOR  $N=0$ ,  $I(NU)$  AND  $I(NU+1)$  ARE ALWAYS COMPUTED.

THIS SUBROUTINE ALSO COMPUTED THE I-BESSEL FUNCTION.

## USAGE

CALL BESSK (X, FNU, N, VI, VK)

## DESCRIPTION OF PARAMETERS

- X - THE ARGUMENT ( $X > 0.0$ )
- FNU - NU, THE FRACTIONAL PART OF THE ORDER ( $0. \leq FNU \leq 1.$ )
- N - HIGHEST ORDER IS  $(N+FNU)$   
ABS(N)+1 TABLE ENTRIES ARE TO BE COMPUTED
- VI - ARRAY TO CONTAIN THE COMPUTED TABLE  
(DIMENSION MUST BE AT LEAST:  $\text{MAX}(N+13, X+28)$ , THE  
REST OF THE ARRAY IS WORK AREA)  
 $VI(1) = (E^{*-X}) I_0(X)$ , WHERE  $I_0$  IS  $I(0+FNU)$   
ETC.
- VK - ARRAY TO CONTAIN THE COMPUTED K-TABLE  
(DIMENSION MUST BE AT LEAST:  $\text{MAX}(N+13, X+28)$ , THE  
REST OF THE ARRAY IS WORK AREA)  
 $VK(1) = (E^{*X}) I_0(X)$ , WHERE  $I_0$  IS  $I(0+FNU)$   
ETC.

CM REQUIRED: 530B

## METHOD

SEE "RECURRENCE TECHNIQUES FOR THE CALCULATION OF BESSEL FUNCTIONS", M. GOLDSTEIN AND R. THALER, MTAC, VOL. XIII, NO. 66, APRIL 1959.

FOR  $X \geq 10.0$ , ASYMPTOTIC VALUES ARE COMPUTED USING THE SO-CALLED PHASE AMPLITUDE METHOD. SEE "BESSEL FUNCTIONS FOR LARGE ARGUMENTS", M. GOLDSTEIN AND R. THALER, MTAC, VOL XII, NO. 61, JANUARY 1958.

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

ALOG      EXP      IABS      MAX0      SIN

OTHERS

BESSI

GAMMA

AUTHORS

FLORENCE F. RAGUSA AND M. GOLDSTEIN  
HARVEY ABRAMSON  
MARGARET FRANTZ  
NEW YORK UNIVERSITY

VIM ROUTINE NYUBESS

DATE WRITTEN: BEFORE 11/65

DATE(S) REVISED

11/65 - HA  
09/01/67 - MF

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED: CLIBRARYUPD3,D=HY  
(\*DECK ?)

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'BESSY'

## PURPOSE

BESSEL FUNCTION OF THE SECOND KIND

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

## REMARKS

FOR  $N=0$ ,  $Y(NU)$  AND  $Y(NU+1)$  ARE ALWAYS COMPUTED.

THIS SUBROUTINE ALSO COMPUTES THE J-BESSEL FUNCTION.

## USAGE

CALL BESSY (X, FNU, N, VJ, VY)

## DESCRIPTION OF PARAMETERS

- X - THE ARGUMENT ( $X > 0.0$ )
- FNU - NU, THE FRACTIONAL PART OF THE ORDER ( $0. \leq FNU \leq 1.$ )
- N - HIGHEST ORDER IS  $(N+FNU)$   
ABS(N)+1 TABLE ENTRIES ARE TO BE COMPUTED
- VJ - ARRAY TO CONTAIN THE COMPUTED TABLE  
(DIMENSION MUST BE AT LEAST:  $\text{MAX}(N+13, X+28)$ , THE  
REST OF THE ARRAY IS WORK AREA)  
 $VJ(1) = J_0(X)$ , WHERE  $J_0$  IS  $J(0+FNU)$   
ETC.
- VY - ARRAY TO CONTAIN THE COMPUTED Y-TABLE  
(DIMENSION MUST BE AT LEAST:  $\text{MAX}(N+13, X+28)$ , THE  
REST OF THE ARRAY IS WORK AREA)  
 $VY(1) = Y_0(X)$ , WHERE  $Y_0$  IS  $Y(0+FNU)$   
ETC.

CM REQUIRED: 452B

## METHOD

SEE "RECURRENCE TECHNIQUES FOR THE CALCULATION OF BESSEL FUNCTIONS", M. GOLDSTEIN AND R. THALER, MTAC, VOL. XIII, NO. 66, APRIL 1959.

FOR  $X > 10.0$ , ASYMPTOTIC VALUES ARE COMPUTED USING THE SO-CALLED PHASE AMPLITUDE METHOD. SEE "BESSEL FUNCTIONS FOR LARGE ARGUMENTS", M. GOLDSTEIN AND R. THALER, MTAC, VOL XII, NO. 61, JANUARY 1958.

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

ABS	COS	IABS	MAX0	SIN
SQRT				
OTHERS				
BESSJ				
GAMMA				

AUTHORS

FLORENCE F. RAGUSA AND M. GOLDSTEIN  
HARVEY ABRAMSON  
MARGARET FRANTZ  
NEW YORK UNIVERSITY

VIM ROUTINE NYUBESS

DATE WRITTEN: BEFORE 11/65

DATE(S) REVISED

11/65 - HA

09/01/67 - MF

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED:

CLIBRARYUPD3,D=HY  
(\*DECK ?)

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'BSJ'

PURPOSE  
SPHERICAL BESSEL FUNCTION

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

REMARKS  
EVALUATES THE SPHERICAL BESSEL FUNCTION J-SUB-N(X) FOR  
N=-1,0,...,I BY MEANS OF A RECURSIVE RELATION AND REASONABLE  
STARTING VALUES. STARTING VALUES ARE GENERATED WITHIN THE  
SUBROUTINE.

USAGE  
CALL BSJ(I, X, BJ)

DESCRIPTION OF PARAMETERS  
I - HIGHEST ORDER DESIRED  
X - SINGLE PRECISION FLOATING POINT VARIABLE  
BJ - ARRAY DIMENSIONED AT LEAST I+2 FOR SOLUTIONS  
(BJ(N+2) = J-SUB-N(X))

CM REQUIRED: 432B

METHOD  
A. THE VALUES ARE COMPUTED BY USING THE RECURSION FORMULA:

$$J_{I-1}(X) + J_{I+1}(X) = \frac{2I+1}{X} J_I(X)$$

IF X>20.5, THE RECURSION IS FORWARD.  
IF X<20.5, THE RECURSION IS BACKWARD.  
FOR VARIOUS RANGES (X<20.5), AN UPPER LIMIT, NU, IS SET.  
BJ(NU+1) IS THEN SET TO ZERO, AND THE RECURSION PROCESS  
IS EXECUTED.

B. RANGE: THE FOLLOWING DOMAINS HAVE BEEN CAREFULLY CHECKED:  
1<X<25; I<25. ERROR IS LESS THAN +5X10\*\*-11. POSSIBLE  
DOMAINS ARE: 0<I<25 AND 0<X<100. (CAUTION: FOR LARGER  
DOMAINS, CHECK DIMENSIONING IN THE SUBROUTINE.)  
NOTE: IF I>>X, J-SUB-I(X) IS VERY SMALL.

REFERENCES  
HANDBOOK OF MATHEMATICAL FUNCTIONS, AMS 55, NATIONAL BUREAU  
OF STANDARDS.  
  
ASSOCIATION OF COMPUTING MACHINERY, "GENERATION OF SPHERICAL  
BESSEL FUNCTIONS", F. J. CORBATO AND J. L. URETSKY, JULY  
1959, VOL. 6, NO. 3, PP. 366-375.



SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
COS SIN  
OTHERS  
NONE

AUTHORS

R L PEXTON - LAWRENCE RADIATION LABORATORY  
D A WILBER - LAWRENCE RADIATION LABORATORY

DATE WRITTEN: 01/06/65 (RLP)

DATE(S) REVISED  
11/65 (DAW)

LOCATION OF DECKS

SOURCE

TAPE LABELLED: CLIBRARYUPD3

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'BUFSIZE'

## PURPOSE

PRINT MESSAGE IN DAYFILE FOR EACH FILE SPECIFIED  
INDICATING BUFFER SIZE AND WHETHER BUFFER IS  
CURRENTLY ALLOCATED.

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: COMPASS

## REMARKS

THIS ROUTINE PICKS UP THE BUFFER SIZE (BFS) FROM WORD 4 OF  
THE FIT. IT ALSO DETERMINES IF THE BUFFER IS CURRENTLY  
ALLOCATED BY CHECKING THE BUFFER FIRST WORD ADDRESS (FWB)  
IN WORD 6 OF THE FIT. IT PRINTS A REPORT IN THE DAYFILE  
OF THE FORM:

FILE (LFN)	FILE BUFFER SIZES SIZE (OCTAL)	ALLOCATED
XXXXXX	XXXXXX	Y OR N

## USAGE

CALLLED FROM COBOL PROGRAM  
ENTER BUFSIZE USING FILENAME1, FILENAM2,.....  
WHERE FILENAMEX IS NAME OF FILE IN FD STATEMEN

CALLLED FROM FTN PROGRAM  
CALL BUFSIZE (FIT1, FIT2, .....)  
WHERE FITX IS ADDRESS OF A FILE INFORMATION  
TABLE.

CM REQUIRED: 72B WORDS

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
NONE  
OTHERS  
NONE

AUTHOR  
BRUCE D. BLACK - DTNSRDC CODE 1892.1 (CDC)

DATE WRITTEN: 04/07/78

DATE(S) REVISED

LOCATION OF DECKS  
SOURCE  
UPDATE LIBRARY: NSRDCPL.ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'CELLI'  
SUBROUTINE 'ELLI'

PURPOSE

COMPLETE AND INCOMPLETE ELLIPTIC INTEGRALS OF THE FIRST AND  
SECOND KIND

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

CELLI IS AN ENTRY POINT IN ELLI.

WHEN  $ABS(PHI) < \pi/2$ , F AND E ARE ACCURATE TO AT LEAST 10  
SIGNIFICANT FIGURES. AS  $ABS(PHI)$  GETS LARGE, THE ACCURACY  
WILL NOT BE AS GOOD SINCE ELLI USES THE TANGENT SUBROUTINE  
WHICH BECOMES LESS ACCURATE AS THE ANGLE  $ABS(PHI)$  INCREASES.

USAGE

CALL CELLI (PHI, CAY, F, E)  
CALL ELLI (PHI, CAY, F, E)

DESCRIPTION OF PARAMETERS

PHI - UPPER LIMIT OF INTEGRAL  
(NOT USED BY CELLI WHICH ASSUMES  $\pi/2$ )  
CAY - THE PARAMETER IN THE INTEGRAL  
F - OUTPUT THE ELLIPTIC INTEGRAL OF THE FIRST KIND  
(F(PHI,CAY))  
E - OUTPUT THE ELLIPTIC INTEGRAL OF THE SECOND KIND  
(E(PHI,CAY))

CM REQUIRED: 457B (+ 60B FOR LABRT)

ERROR MESSAGES

IF  $K > 1$ , F AND E DO NOT EXIST. A MESSAGE IS PRINTED AND  
F AND E ARE SET TO PHI.

IF  $K=1$  AND  $ABS(PHI) > \pi/2$ , F DOES NOT EXIST. A MESSAGE IS  
PRINTED AND F IS SET TO  $SIGN(PHI)*1.0E+294$ . E EXISTS AND IS  
COMPUTED.

OUTPUT UNITS

UNIT #	LFN	USE
-----	-----	-----
	OUTPUT	ERROR MESSAGES PRINTED BY LABRT

METHOD

WHEN  $K < 1$ , LANDEN'S TRANSFORMATION IS USED.

WHEN  $K=1$ , E IS COMPUTED BY:

$$E(\text{PHI}, 1) = N + \text{ABS}(\text{SIN}(\text{PHI}) - \text{SIN}(N \cdot \text{PI}/2))$$

WHERE N IS THE INTEGRAL PART OF  $\text{PHI} \cdot (2/\text{PI})$ .

WHEN  $K=1$  AND  $\text{ABS}(\text{PHI}) < \text{PI}/2$ , F IS COMPUTED BY:

$$F(\text{PHI}, 1) = .5 * \text{LN} \left( \frac{1 + \text{SIN}(\text{PHI})}{1 - \text{SIN}(\text{PHI})} \right)$$

REFERENCE: "HANDBOOK OF MATHEMATICAL FUNCTIONS" BY M. ABRAMOWITZ AND I. A. STEGUN.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

ABS	AIN	ALOG	AMIN1	AMOD
ATAN	FLOAT	INT	MOD	SIGN
SIN	SQRT	TAN		

PART OF PROGRAM

LABRT - PRINT ERROR MESSAGES

OTHERS

NONE

AUTHORS

KARL J MELENDEZ

DUANE HARDER

LOS ALAMOS SCIENTIFIC LABORATORY

VIM ROUTINE LASL C304A

DATE WRITTEN: 02/05/68

DATE(S) REVISED

02/69 - DH

LOCATION OF DECKS

SOURCE

CODE 1892 (LISTING ONLY)

(\*DECK ?)

OBJECT

EDITLIB USER LIBRARY: NSRDC

## SUBROUTINE 'CENTER'

### PURPOSE

CENTER A CHARACTER STRING WITHIN AN OUTPUT FIELD

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV

### COMPUTERS

BURROUGHS B7700

CDC 6000

### REMARKS

USEFUL FOR CENTERING HEADINGS ON A PAGE. FOR INSTANCE, IF 'THIS IS A HEADING' IS TO BE CENTERED FOR A 132-COLUMN WIDE PAGE, THE FOLLOWING CAN BE USED:

DIMENSION IN(2), OUT(14)

IN(1) = 10HTHIS IS A

IN(2) = 10HHEADING

CALL CENTER (IN, 2, OUT, 132)

ON RETURN, 'OUT' WILL CONTAIN 'THIS IS A HEADING' IN POSITIONS 58 THRU 74 (WORD 6, POSITION 8 THRU WORD 8, POSITION 4). POSITIONS 1-56 AND 75-132 WILL CONTAIN BLANKS.

### USAGE

CALL CENTER (IN, LIN, OUT, NCHOUT)

### DESCRIPTION OF PARAMETERS

IN - INPUT ARRAY CONTAINING CHARACTER STRING TO BE CENTERED  
(CHARACTER STRING STARTS IN POSITION 1 AND ENDS WITH LAST NON-BLANK CHARACTER)

LIN - NUMBER OF WORDS IN 'IN'

OUT - OUTPUT ARRAY IN WHICH 'IN' IS TO BE CENTERED

NCHOUT - NUMBER OF CHARACTERS IN 'OUT' WITHIN WHICH 'IN' IS TO BE CENTERED

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

MOD            MOVLEV

OTHERS

GETCHA - GET CHARACTER FROM ARRAY (CDC VERSION)  
LASTCH - FIND LAST NON-BLANK IN ARRAY  
MOVLEV - MOVE AN ARRAY (B7700 VERSION)  
MOVSTR - MOVE A STRING (B7700 VERSION)  
PUTCHA - INSERT CHARACTER INTO ARRAY (CDC VERSION)  
VFILL - FILL ARRAY WITH SPECIFIED WORD

CM REQUIRED: B7700: EST 267 WORDS; CDC 6000: 145B

AUTHOR

DAVID V SOMMER - NSRDC CODE 1892.2

DATE WRITTEN: 05/19/75

DATE(S) REVISED

05/04/76

07/01/80 - CONVERT TO B7700

LOCATION OF DECKS

SOURCE

B7700 : \*SOURCE/NSRDC/CENTER

CDC 6000: UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

B7700 : \*NSRDC/CENTER

CDC 6000: EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'CGAUSS'

## PURPOSE

COMPLEX SOLUTION OF SIMULTANEOUS EQUATIONS AND DETERMINANT  
BY ITERATIVE GAUSSIAN ELIMINATION

FUNCTIONAL CATEGORIES: F4

LANGUAGE: FORTRAN IV EXTENDED

## REMARKS

TO INCREASE BEYOND 10 BY 10, THE DIMENSIONS OF ARRAYS A, AA,  
B, BB, X, XX AND IN MUST BE CHANGED.

## USAGE

COMPLEX AA(10,10), BB(10,10), XX(10,10), DET  
CALL CGAUSS (N, M, AA, BB, XX, VAL2, DET, MM, NA, NX)

## DESCRIPTION OF PARAMETERS

N - NUMBER OF ROWS OF AA, BB, XX (MAX: 10)  
M - NUMBER OF COLUMNS OF RIGHT-HAND SIDES (MAX: 10)  
AA - COMPLEX ARRAY OF COEFFICIENTS FOR SIMULTANEOUS  
EQUATIONS  $AA \cdot XX = BB$  (MAX: 10 BY 10)  
BB - COMPLEX ARRAY OF RIGHT-HAND-SIDES FOR  $AA \cdot XX = BB$   
(MAX: 10 BY 10)  
XX - COMPLEX ARRAY OF SOLUTIONS OF  $AA \cdot XX = BB$   
(MAX: 10 BY NX)  
VAL2 - OUTPUT THE INFINITY NORM OF THE CORRECTION  
DET - OUTPUT THE COMPLEX DETERMINANT OF AA  
MM - NUMBER OF ITERATIONS  
(MM=0 RETURNS THE RESULT OF THE FIRST GAUSSIAN  
ELIMINATION)  
NA - DIMENSIONS OF AA AND BB AND FIRST DIMENSION OF XX  
NX - SECOND DIMENSION OF XX

CM REQUIRED: 1711B

## METHOD

A FIRST SOLUTION FOR XX IS OBTAINED DIRECTLY.  $BB - AA \cdot XX$  IS  
CALCULATED AS DD. THE RESIDUAL EQUATION  $AA \cdot X = DD$  IS SOLVED  
AND THE SOLUTION ADDED TO XX. THIS PROCESS CONTINUES FOR MM  
CYCLES. IF MM=0, THE RESULT OF THE FIRST GAUSSIAN  
ELIMINATION IS RETURNED.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
CABS  
OTHERS  
NONE

AUTHORS  
UNIVERSITY OF MARYLAND  
SUE VOIGT

DATE WRITTEN: 1971

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED: CLIBRARYUPD3.D=HY  
(\*DECK AMCGAUS)

OBJECT

EDITLIB USER LIBRARY: NSRDC



SUBROUTINE 'CHFILL'

PURPOSE

FILL (PORTION OF) ARRAY WITH CHARACTER

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS

CDC 6000

REMARKS

SAME CALLING SEQUENCE AS CDC 6000, EXCEPT FOR TYPE.

USAGE

CALL CHFILL (FILLCH, TO, TOPOS, NCHAR)

DESCRIPTION OF PARAMETERS

FILLCH - FILL CHARACTER (1R OR 1H OR " ")  
TO - INTEGER ARRAY TO BE FILLED  
TOPOS - STARTING CHARACTER POSITION IN 'TO'  
(CHARACTER 1 IS LEFT-MOST CHARACTER OF TO(1))  
NCHAR - NUMBER OF CHARACTERS TO BE FILLED

CM REQUIRED: 56B

EXAMPLE

TO: \*\*\*\*\*  
AFTER CALL CHFILL (1R/, TO, 23, 7)  
TO: \*\*\*\*\*////////\*

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND SHIFT

OTHERS

PUTCHA - INSERT CHARACTER INTO ARRAY

ARITHMETIC STATEMENT FUNCTIONS

L11FMT - FAST L-FORMAT DECODE (LEFT-ADJ. ZERO-FILLED)

R11FMT - FAST R-FORMAT DECODE (RIGHT-ADJ. ZERO-FILLED)

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/10/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

## SUBROUTINE 'CHNGSEQ'

### PURPOSE

ALLOW COBOL4 USER TO DEFINE HIS OWN COLLATING SEQUENCE

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC 6000 CP COMPASS

### REMARKS

USER MUST USE THE U OPTION ON THE COBOL CALL CARD.

BINARY ZERO IS THE 64TH CHARACTER IN THE COLLATING SEQUENCE.

ROUTINE SETS TABLES AFFECTING COLLATING SEQUENCE FOR  
COBOL IF TESTS, COBOL SORT, INDEX SEQ FILE SEQUENCE, ETC.

### USAGE

CALL CHNGSEQ USING MYTBL.

### DESCRIPTION OF PARAMETER

THE USER MUST SET UP A DATA ITEM 63 CHARACTERS IN  
LENGTH CONTAINING THE CHARACTERS IN THE ORDER HE  
WISHES THE COLLATING SEQUENCE TO BE. ALL 63  
CHARACTERS MUST BE PRESENT.

NOTE: TO SET " INTO THE STRING, REDEFINE AND USE  
MOVE QUOTE TO .....

### EXAMPLE:

```
01 MYTBL PIC X(63) VALUE " @: & # & ' ? > \ ~ . ) ; + $ * - / , ( = < ABCDEF  
- "GHI|JKLMNOPQR!STUVWXYZ0123456789".  
01 MYTBLA REDEFINES MYTBL.  
03 ENTR PIC X OCCURS 63 TIMES.
```

RECALL THAT A NON-NUMERIC LITERAL MUST CONTINUE THRU  
COL 72 OF THE FIRST CARD AND THAT CONTINUATION CARD  
MUST HAVE A HYPHEN IN COL 7. (EXAMPLE HERE DOESN'T  
GO TO COL. 72).

### PROCEDURE DIVISION.

PAR1.

MOVE QUOTE TO ENTR (24).  
CALL CHNGSEQ USING MYTBL.

CM REQUIRED: 27B

### METHOD

COLLATING SEQUENCE TABLES IN COBOL OBJECT TIME ROUTINES  
ARE CHANGED.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
NONE  
OTHERS  
NONE

AUTHOR  
BRUCE D BLACK DTNSRDC 1892.1 (CDC)

DATE WRITTEN: 11/15/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE  
UPDATE LIBRARY: NSRDCPL,ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'CLUNLD'

PURPOSE

CLOSE AND UNLOAD A FILE

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS

CDC 6000

REMARKS

CAUTION: FOR ICLT=1 OR 2, BE SURE BUFFERS HAVE BEEN FLUSHED BEFORE UNLOADING A PERMANENT FILE IF YOU EXPECT TO USE IT AGAIN. (I.E., CLOSE THE FILE BEFORE CALLING CLUNLD)

CAUTION: RANDOM PERMANENT FILES MUST BE CLOSED BEFORE CLUNLD IS CALLED TO INSURE THAT THE LATEST INDEX IS WRITTEN.

FORTRAN SEQUENTIAL FILES SHOULD HAVE THEIR BUFFERS FLUSHED BE REWINDING THEM BEFORE CALLING CLUNLD.

USAGE

CALL CLUNLD (IERR, ICLT, LFN)

DESCRIPTION OF PARAMETERS

IERR - ERROR RETURN CODE (0=NO ERRORS)

ICLT - TYPE OF CONTENTS OF 'LFN'

1 - LFN CONTAINS THE ADDRESS OF A FET.

A CLOSE-UNLOAD IS PERFORMED ON THIS FET.

2 - LFN CONTAINS AN LFN TO BE UNLOADED.

A DUMMY FET IS CREATED AND THE FILE UNLOADED.

3 - LFN CONTAINS A FILE NAME OR FORTRAN LOGICAL UNIT NUMBER (I.E., ANY FILE ON THE FORTRAN PROGRAM STATEMENT). THE FIT WILL BE FOUND AND THE FILE UNLOADED.

NOTE: CLOSEM (A RECORD MANAGER ROUTINE) IS CALLED TO CLOSE THE FILE.

NOTE: A DUMMY FET IS CREATED TO UNLOAD A FILE THAT RECORD MANAGER DOESN'T KNOW HAS BEEN ATTACHED.

LFN - CONTENTS IS DETERMINED BY 'ICLT'

CM REQUIRED: 43B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

NONE

OTHERS

CLUXXX FNDFIT INDCMT IZONK ZIO

AUTHOR

C M CHERNICK - DTNSRDC CODE 1832

DATE WRITTEN: 11/15/71

DATE(S) REVISED

06/01/72 11/20/74 02/21/75 05/75 04/76

LOCATION OF DECKS

SOURCE

CODE 1832

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'CMPINV'

## PURPOSE

COMPLEX MATRIX INVERSION

FUNCTIONAL CATEGORIES: F4 A2

LANGUAGE: FORTRAN IV EXTENDED

## REMARKS

THE REAL AND/OR IMAGINARY PARTS OF THE MATRIX 'A' MAY BE SINGULAR.

## USAGE

CALL CMPINV (A, N, N1, C, ID, E, N2, INDEX)

## DESCRIPTION OF PARAMETERS

A - COMPLEX INPUT MATRIX  
(NOT DESTROYED BY SUBROUTINE)  
N - DIMENSION OF A AND C (N X N)  
N1 - NUMBER OF ROWS IN A AND C CURRENTLY FULL  
C - INVERSE RESULT MATRIX  
(MAY BE THE SAME AS A)  
ID - RETURN CODE  
1 - INVERSION SUCCESSFUL  
2 - MATRIX SINGULAR  
E - TEMPORARY ARRAY SOLVING N2 X N2 SYSTEM  
N2 - NO SMALLER THAN N1+N1  
INDEX - TEMPORARY ARRAY USED IN INVERSION (N2,3)

THE CALLING PROGRAM MUST INCLUDE:

COMPLEX A(N,N), C(N,N)  
REAL E(N2,N2), INDEX(N2,3)

CM REQUIRED: 147B

## METHOD

THE SYSTEM SOLVED IS THE EXPANDED MATRIX

$$E = \begin{bmatrix} \text{AR} & -\text{AI} \\ \text{AI} & \text{AR} \end{bmatrix}$$

WHERE CR IS TAKEN AS THE UPPER LEFT CORNER OF THE INVERSE AND CI IS TAKEN AS THE LOWER LEFT CORNER OF THE INVERSE. (LANCZOS, APPLIED ANALYSIS, P 137). THE INVERSE IS COMPUTED BY SUBROUTINE MATINS (ALSO ON NSRDC) WHICH USES GAUSS-JORDAN ELIMINATION. THIS METHOD FINDS AN INVERSE IF IT EXISTS, EVEN IF REAL AND IMAGINARY PARTS OF A ARE BOTH INDIVIDUALLY SINGULAR. IDENTIFICATION OF A SINGULAR COMPLEX MATRIX IS RETURNED TO THE CALLING PROGRAM.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
    AIMAG        CMPLX        REAL  
OTHERS  
    MATINS - MATRIX INVERSION

AUTHOR  
    SHARON E GOOD - DTNSRDC CODE 1892.2

DATE WRITTEN: 06/10/71

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

TAPE LABELLED: CLIBRARYUPD3,D=HY (DECKNAME: AMCMAT)

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'COMPSTR'

PURPOSE

COMPARE TWO CHARACTER STRINGS

FUNCTIONAL CATEGORIES: MO

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

TEST = COMPSTR (A, FROMA, B, FROMB, NCHAR)

DESCRIPTION OF PARAMETERS

A - ARRAY CONTAINING FIRST CHARACTER STRING  
FROMA - STARTING CHARACTER POSITION IN A  
(POSITION 1 IS LEFT-MOST 6-BIT CHARACTER IN A(1))  
B - ARRAY CONTAINING SECOND CHARACTER STRING  
FROMB - STARTING CHARACTER POSITION IN B  
(POSITION 1 IS LEFT-MOST 6-BIT CHARACTER IN B(1))  
NCHAR - NUMBER OF CHARACTERS TO COMPARE  
COMPSTR - WILL RETURN ONE OF:  
-1. - STRING IN A IS LESS THAN STRING IN B  
0. - STRING IN A IS EQUAL TO STRING IN B  
+1. - STRING IN A IS GREATER THAN STRING IN B

CM REQUIRED: 105B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

GETCHA - GET CHARACTER FROM ARRAY

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/04/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC



SUBROUTINE 'CONTRCT'

PURPOSE

SQUEEZE ARRAY OF 1R-FORMAT CHARACTERS TO LEFT

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

SEE SUBROUTINE 'EXPAND'.

USAGE

CALL CONTRCT (A, B, NCHAR)

DESCRIPTION OF PARAMETERS

A - INPUT ARRAY WHOSE ELEMENTS EACH CONTAIN ONE  
CHARACTER IN THE RIGHT-MOST 6 BITS (1R FORMAT)  
B - OUTPUT ARRAY WHOSE ELEMENTS WILL EACH CONTAIN 10  
CHARACTERS FROM ARRAY A (ANY LEFT-OVER BITS OF THE  
LAST WORD USED IN ARRAY B WILL BE CLEARED TO 0B)  
NCHAR - NUMBER OF CHARACTERS IN ARRAY A

CM REQUIRED: 55B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

MASK MOD

OTHERS

PUTCHA - INSERT CHARACTER INTO ARRAY

ARITHMETIC STATEMENT FUNCTIONS

NWORD - COMPUTE SUBSCRIPT

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/04/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'COUPLE'

PURPOSE

LOGICALLY CONNECT (PORTIONS OF) TWO WORDS

FUNCTIONAL CATEGORIES: R1

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

CALL COUPLE (FL, AWORD, AB, BWORD, BB, LC, IOAC)

DESCRIPTION OF PARAMETERS

FL	-	NUMBER OF BITS TO PROCESS	
AWORD	-	FIRST WORD (FROM)	
AB	-	STARTING BIT POSITION IN AWORD	
BWORD	-	SECOND WORD (TO)	
BB	-	STARTING BIT POSITION IN BWORD	
LC	-	CODE FOR LOGICAL CONNECTIVE DESIRED	
		0 - PUT ZEROS INTO BWORD FIELD	(0)
		1 - AND THE FIELDS	(M.A)
		2 - AND THE COMPLEMENT OF A TO B	(M.A*)
		3 - NUMBER OF ONE IN THE LAST FIELD	(M)
		4 - AND THE COMPLEMENT OF B TO A	(M*.A)
		5 - SUBSTITUTE FIELD OF A INTO B	(A)
		6 - EXCLUSIVE OR	
		7 - OR	(M+A)
		8 - AND COMPLEMENTS	(A*.B*)
		9 - IDENTITY	(B=A)
		10 - SUBSTITUTE COMPLEMENT OF A INTO B	(A*)
		11 - OR THE COMPLEMENT OF A TO B	(M+A*)
		12 - COMPLEMENT OF B	(M*)
		13 - OR A TO THE COMPLEMENT OF B	(A+M*)
		14 - OR THE COMPLEMENTS OF A AND B	(A**M*)
		15 - PUT ONES INTO BWORD FIELD	(1)
IOAC	-	OUTPUT NUMBER OF ONE-BITS FOR LC=3	

CM REQUIRED: 224B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

IAOC - COUNT ONE BITS IN A WORD

MASKIT - MULTIPLE-FIELD MASK GENERATOR

AUTHOR  
NWL

DATE WRITTEN:

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'DATCNV'

PURPOSE

CONVERT DATE FORMATS

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS

BURROUGHS B7700

CDC 6000

REMARKS

MAY BE USED FOR ANY GREGORIAN DATE FROM OCT 15, 1582 THRU  
FEB 28, 4000.

USEFUL IS DETERMINING THE ELAPSED NUMBER OF DAYS BETWEEN TWO  
CALENDAR DATES.

MAY BE USED TO FIND THE DATE SO MANY DAYS FROM A GIVEN DATE.

IF THE DATE IS RETAINED IN A DATA BASE IN THE RELATIVE-DAY  
FORM, IT CAN BE USED IN MANY COMPUTATIONS AND CONVERTED FOR  
PRINTOUT WITHOUT THE NEED TO WORRY ABOUT LEAP YEARS AND  
CHANGE OF CENTURY.

USAGE

CALL DATCNV (ITYPE, IYR, IMO, IDYMO, IDYRD, IDYYR, IDYWK)

DESCRIPTION OF PARAMETERS

ITYPE - TYPE OF CONVERSION DESIRED

1 - IN: IYR IMO IDYMO

OUT: IDYRD IDYYR IDYWK

2 - IN: IYR IDYYR

OUT: IMO IDYMO IDYRD IDYWK

3 - IN: IDYRD

OUT: IYR IMO IDYMO IDYYR IDYWK

IYR - YEAR (E.G., 1979)

IMO - MONTH (1 TO 12)

IDYMO - DAY-OF-MONTH (1 TO 31)

IDYRD - RELATIVE DAY

(RETURNS -1 IF ITYPE IS OUT OF RANGE)

IDYYR - DAY-OF-YEAR (1 TO 366)

IDYWK - DAY-OF-WEEK (0 TO 6, SUN IS 0)

CM REQUIRED: CDC: 165B

B7700: EST 154 WORDS

# EXAMPLES

1. CONVERT JULY 11, 1979 TO THE OTHER FORMS:

CALL DATCNV (1, 1979, 7, 11, IDYRD, IDYYR, IDYWK)

RETURNS IDYRD=2444066 IDYYR=192 IDYWK=3 (WEDNESDAY)

2. CONVERT DAY 192 OF 1979 TO THE OTHER FORMS:

CALL DATCNV (2, 1979, IMO, IDYMO, IDYRD, 192, IDYWK)

RETURNS IMO=7 IDYMO=11 IDYRD=2444066 IDYWK=3

3. CONVERT RELATIVE DAY 2444066 TO OTHER FORMS:

CALL DATCNV (3, IYR, IMO, IDYMO, 2444066, IDYYR,  
A IDYWK)

RETURNS IYR=1979 IMO=7 IDYMO=11 IDYYR=192 IDYWK=3

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

JGDATE - JULIAN-GREGORIAN CONVERTER (MULTI-YEAR)

JULIAN - JULIAN-GREGORIAN CONVERTER (SINGLE YEAR)

WEKDAY - FIND DAY-OF-WEEK

## AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/11/79

DATE(S) REVISED

## LOCATION OF DECKS

SOURCE

CDC 6000: UPDATE LIBRARY: NSRDCPL, ID=CSYS

B7700 : \*SOURCE/NSRDC/DATCNV

OBJECT

CDC 6000: EDITLIB USER LIBRARY: NSRDC

B7700 : \*NSRDC/DATCNV

SUBROUTINE 'DATFMT'

PURPOSE

DATE FORMAT CONVERSION

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS

BURROUGHS B7700

CDC 6000

REMARKS

FOR CDC, ALL PARAMETERS ARE SIMPLE INTEGER VARIABLES.  
FOR B7700, 'OLD' AND 'NEW' ARE 2-WORD REAL ARRAYS.

USAGE

CALL DATFMT (FMTOLD, FMTNEW, OLD, NEW)

DESCRIPTION OF PARAMETERS

FMTOLD - INPUT FORMAT (OLD) -- ONE OF

- 1 - 'MM/DD/YY'
- 2 - 'MM/DD/YY'
- 3 - 'MMDDYY'
- 1 - 'YY/MM/DD'
- 2 - 'YY/MM/DD'
- 3 - 'YYMMDD'

FMTNEW - OUTPUT FORMAT (NEW)  
(SAME VALUES AS FMTOLD)

OLD - DATE TO BE CONVERTED (SEE REMARKS)

NEW - WILL CONTAIN CONVERTED DATE (SEE REMARKS)

CM REQUIRED: B7700: CORE: EST 252 WORDS; STACK: EST 4 WORDS  
CDC : 146B

EXAMPLE

CHANGE MMDDYY TO YY/MM/DD:

B7700---

REAL OLD(2)/ '072579' /

REAL NEW(2)

CALL DATFMT (3, -1, OLD, NEW)

NEW WILL CONTAIN: '79/07/25' /

CDC 6000---

INTEGER FMTOLD, FMTNEW, OLD, NEW

DATA OLD/ "072579"/

CALL DATFMT (3, -1, OLD, NEW)

NEW WILL CONTAIN: "79/07/25" /

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

B7700: ABS  
CDC : AND OR SHIFT  
OTHERS  
NONE

ARITHMETIC STATEMENT FUNCTIONS (CDC 6000)

FAST R-FORMAT DECODE (RIGHT-ADJ. ZERO-FILLED)

R21FMT R22FMT R23FMT R24FMT R25FMT  
R27FMT R28FMT

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: B7700: 08/08/79

CDC : 02/22/80

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

B7700: \*SOURCE/NSRDC/DATFMT

CDC : UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

B7700: \*NSRDC/DATFMT

CDC : EDITLIB USER LIBRARY: NSRDC

## SUBROUTINE 'DISCOT'

### PURPOSE

SINGLE OR DOUBLE INTERPOLATION

FUNCTIONAL CATEGORIES: E1

LANGUAGE: FORTRAN IV EXTENDED

### REMARKS

GIVEN A FUNCTION WITH TWO INDEPENDENT VARIABLES, X AND Z, THIS SUBROUTINE PERFORMS KX- AND KZ-ORDER INTERPOLATION TO CALCULATE THE DEPENDENT VARIABLE. ALL SINGLE-LINE FUNCTIONS ARE READ IN AS 2 SEPARATE ARRAYS AND ALL MULTI-LINE FUNCTIONS ARE READ IN AS 3 SEPARATE ARRAYS.

WHEN TABULATING DISCONTINUOUS FUNCTIONS, THERE MUST ALWAYS BE K+1 POINTS ABOVE AND BELOW THE DISCONTINUITY IN ORDER TO GET PROPER INTERPOLATION.

WHEN TABULATING ARRAYS FOR THIS SUBROUTINE, BOTH INDEPENDENT VARIABLES MUST BE IN ASCENDING ORDER.

IN SOME ENGINEERING PROGRAMS WITH MANY TABLES, IT IS QUITE DESIRABLE TO READ IN ONE ARRAY OF X'S THAT COULD BE USED FOR ALL LINES OF A MULTI-LINE FUNCTION OR DIFFERENT FORMULA. THIS NOT ONLY SAVES MUCH TIME IN PREPARING TABULAR DATA, BUT CAN ALSO SAVE MANY LOCATIONS PREVIOUSLY USED WHEN EVERY Y-COORDINATE HAD TO HAVE A CORRESPONDING X-COORDINATE. SEE EXAMPLES.

ANOTHER FEATURE IS THE POSSIBILITY OF A MULTI-LINE FUNCTION WITH NO EXTRAPOLATION ABOVE THE TOP LINE. SEE EXAMPLES.

### USAGE

CALL DISCOT (X, Z, TABX, TABY, TABZ, NC, NY, NZ, Y)

### DESCRIPTION OF PARAMETERS

X - X-ARGUMENT  
Z - Z-ARGUMENT  
(MAY BE SAME AS X ON SINGLE LINES)  
TABX - ARRAY OF X'S  
TABY - ARRAY OF Y'S  
TABZ - ARRAY OF Z'S  
NC - CONTROL WORD (+HTU)  
+ IMPLIES  $NX = NY/NZ$   
- IMPLIES  $NX = NY$   
H=0 - EXTRAPOLATE WHEN  $Z > Z_{MAX}$   
=1 - NO EXTRAPOLATION ABOVE  $Z_{MAX}$   
T=1 TO 7 - DEGREE INTERPOLATION IN X DIRECTION  
U=1 TO 7 - DEGREE INTERPOLATION IN Z DIRECTION  
NY - NUMBER OF POINTS IN Y ARRAY  
NZ - NUMBER OF POINTS IN Z ARRAY  
Y - OUTPUT DEPENDENT VARIABLE

CM REQUIRED: 5208



# EXAMPLES

- 1) GIVEN  $Y = F(X)$  KX=3  
 PROGRAM SAMPL1 (TAPE7,.....  
 DIMENSION TABX(50), TABY(50)  
 10 READ (7, 1) (TABX(I), TABY(I), I=1,50)  
 READ (7, 1) X  
 1 FORMAT (8E9.5)  
 CALL DISCOT (X, X, TABX, TABY, TABY, -30, 50, 0, Y)  
 ...
- 2) GIVEN  $Y = F(X,Z)$  KX=7, KZ=3      NX .NE. NY  
 PROGRAM SAMPL2 (TAPE7,.....  
 DIMENSION TABX(80), TABY(800), TABZ(10)  
 10 READ (7, 1) TABX  
 READ (7, 1) TABY  
 READ (7, 1) TABZ  
 READ (7, 1) X, Z  
 1 FORMAT (8E9.5)  
 CALL DISCOT (X, Z, TABX, TABY, TABZ, 73, 800, 10, Y)  
 ...
- 3) GIVEN  $Y = F(X,Z)$  KX=7, KZ=3      NX=NY  
 PROGRAM SAMPL3 (TAPE7,.....  
 DIMENSION TABX(800), TABY(800), TABZ(10)  
 10 READ (7, 1) TABX  
 READ (7, 1) TABY  
 READ (7, 1) TABZ  
 READ (7, 1) X, Z  
 1 FORMAT (8E9.5)  
 CALL DISCOT (X, Z, TABX, TABY, TABZ, -73, 800, 10, Y)  
 ...
- 4) GIVEN  $Y=F(X,Z)$  KX=7, KZ=3      NX=NY  
NO EXTRAPOLATION ABOVE Z-MAX  
  
 SAME AS EXAMPLE 3 WITH 6TH PARAMETER OF CALL TO DISCOT  
 EQUAL TO -173.

## METHOD

LAGRANGE'S INTERPOLATION FORMULA IS USED IN BOTH THE X AND Z DIRECTION. SEE "METHODS IN NUMERICAL ANALYSIS" BY NIELSEN.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

PART OF PROGRAM

DISSER (102B)

LAGRAN (64B)

UNS (31B)

OTHERS

NONE

AUTHOR

J. H. SUM

ALLISON DIVISION

GENERAL MOTORS CORPORATION

SHARE NUMBER 1129

DATE WRITTEN: 05/12/61

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED:

CLIBRARYUPD3,D=HY  
(\*DECK AQALL1)

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'DMPA'

PURPOSE

CALLABLE OCTAL AND CHARACTER DUMP OF SPECIFIED PORTION  
OF USER'S FIELD LENGTH (FL) (BY ACTUAL LOCATION)  
(NO HEADINGS ARE PROVIDED)

FUNCTIONAL CATEGORIES: N2

USAGE

CALL DMPA (FWA, N, INIT)  
CALL DMPA (FWA, N)

DESCRIPTION OF PARAMETERS

FWA - FIRST WORD ADDRESS OF AREA TO DUMP  
(E.G., LOCF (ARRAY))  
N - NUMBER OF WORDS TO DUMP  
INIT - STARTING WORD ADDRESS TO BE PRINTED  
(IF OMITTED, 0 IS USED)

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF

OTHERS

EQU60 - LOGICAL ARRAY COMPARE  
MFETCH - READ WORD IN USER'S FL

LANGUAGE: FORTRAN IV

OUTPUT UNIT

UNIT #	LFN	USE
-----	-----	-----
	OUTPUT	LISTABLE OUTPUT

CM REQUIRED: 315B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATA WRITTEN: 06/14/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLB USER LIBRARY: NSRDC

SUBROUTINE 'DMPCPA'

PURPOSE

DUMP JOB CONTROL POINT AREA

FUNCTIONAL CATEGORIES: N2

USAGE

CALL DMPCPA

REMARKS

OCTAL AND CHARACTER DUMP

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

DATE TIME

OTHERS

RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

OUTPUT UNITS

<u>UNIT #</u>	<u>LFN</u>	<u>USE</u>
OUTPUT		LISTABLE OUTPUT

CM REQUIRED: 324B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/29/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'DPROOT'

## PURPOSE

FIND ALL ROOTS OF A REAL DOUBLE PRECISION POLYNOMIAL

FUNCTIONAL CATEGORIES: C2 B4

LANGUAGE: FORTRAN IV

## REMARKS

THE POLYNOMIAL HAS THE FORM:

$$A_1 + A_2 X + \dots + A_{N+1} X^{**N} = 0$$

## USAGE

CALL DPROOT (N, A, U, V, H, B, C, CONV, NPLUS2)

## DESCRIPTION OF PARAMETERS

- N - DEGREE OF THE POLYNOMIAL TO BE SOLVED
- A - DOUBLE PRECISION ARRAY (DIMENSIONED N+2) CONTAINING THE COEFFICIENTS IN THE ORDER INDICATED ABOVE
- U - DOUBLE PRECISION ARRAY (DIMENSIONED N+2) WHICH WILL CONTAIN THE REAL PARTS OF THE ROOTS
- V - DOUBLE PRECISION ARRAY (DIMENSIONED N+2) WHICH WILL CONTAIN THE IMAGINARY PARTS OF THE ROOTS
- H,B,C - DOUBLE PRECISION WORK ARRAYS (EACH DIMENSIONED N+2)
- CONV - CONVERGENCE CRITERION. INITIALLY SET BY DPROOT TO 1.0D-35 (FAR BELOW THE ACTUAL STARTING CONVERGENCE CRITERION OF 5.0D-20 (CDC 6600)). IF THE POLYNOMIAL HAS NOT CONVERGED AFTER A PRESCRIBED NUMBER OF TRIES, THE CONVERGENCE CRITERION IS RELAXED. IF, UPON EXIT FROM DPROOT, CONV IS NOT 1.0D-35, THE CONVERGENCE CRITERION HAS BEEN RELAXED TO THE NUMBER GIVEN. (CONV IS DOUBLE PRECISION.)
- NPLUS2 - MUST BE SET TO N+2

CM REQUIRED: 1153B

## METHOD

THE ROUTINE CONVERGES SIMULTANEOUSLY TOWARD A LINEAR FACTOR AND A QUADRATIC FACTOR BY NEWTON'S AND BAIRSTOW'S METHODS, RESPECTIVELY. WHEN A ROOT IS FOUND BY ONE METHOD, ITERATION CONTINUES WITH BOTH METHODS USING THEIR MOST RECENT GUESSES.

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE  
DABS DSIGN SQRT  
OTHERS  
NONE

AUTHOR  
HARVEY ABRAMSON - NEW YORK UNIVERSITY

DATE WRITTEN: 01/66

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

TAPE LABELLED: CLIBRARYUPD3

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'DUMPA'

## PURPOSE

GIVE OCTAL AND CHARACTER DUMP OF USER-SPECIFIED AREA

FUNCTIONAL CATEGORIES: N2

## USAGE

CALL DUMPA (AREA, NWORDS, NAME)

## DESCRIPTION OF PARAMETERS

AREA - START OF AREA TO BE DUMPED  
NWORDS - NUMBER OF WORDS TO DUMP  
NAME - 1-10 CHARACTER IDENTIFICATION OF START OF AREA  
(E.G., 10HMYAREA(1) )  
(WILL BE PRINTED IN HEADING LINE)

## REMARKS

LINES CONTAIN 4 WORDS EACH. IF A LINE IS THE SAME AS THE  
PREVIOUS LINE, IT IS NOT PRINTED (UNLESS IT IS THE LAST  
LINE).

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

COMPL

OTHERS

NONE

## ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

## OUTPUT UNITS

UNIT #	LFN	USE
	OUTPUT	LISTABLE OUTPUT

CM REQUIRED: 257B

## AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/06/76

DATE(S) REVISED

## LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'DUMPCPA'

PURPOSE

EXPANDED DUMP OF JOB CONTROL POINT AREA

FUNCTIONAL CATEGORIES: N2

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

EACH FIELD IS PRINTED SEPARATELY.

PRINTOUT IS AT 8 LINES PER INCH AND IS RESTORED TO  
6 LINES PER INCH BEFORE RETURN.

USAGE

CALL DUMPCPA

CM REQUIRED: 5072B

OUTPUT UNITS

UNIT #	LFN	USE
--------	-----	-----

-----	-----	-----
OUTPUT	LISTABLE	OUTPUT

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND	DATE	OR	SHIFT	TIME
-----	------	----	-------	------

OTHERS

EXTBIT	-	EXTRACT BITS FROM A WORD
GETLIB	-	GET STSYEM LIBRARY NAME
IPAKLFT	-	SQUEEZE LEFT, REMOVE BLANKS AND 00B
RCPA	-	READ CONTROL POINT AREA
UNHEX3	-	CONVERT 2-CHARACTER CODE TO 3 HEX DIGITS
VFILL	-	FILL ARRAY WITH WORD

ARITHMETIC STATEMENT FUNCTIONS

FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

L71FMT

FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

R1FMT	R11FMT	R16FMT	R19FMT	R110FMT
R21FMT	R23FMT	R25FMT	R27FMT	R29FMT
R31FMT	R32FMT	R34FMT	R35FMT	R36FMT
R38FMT	R41FMT	R45FMT	R65FMT	R71FMT



AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/30/75

DATE(S) REVISED

02/27/76

01/25/78 - UPGRADE TO NOS/BE LEVEL 454

11/28/78 - UPGRADE TO NOS/BE LEVEL 461

02/05/81 - UPGRADE TO NOS/BE LEVEL 508

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'DUMPFL'

## PURPOSE

CALLABLE OCTAL AND CHARACTER DUMP OF SPECIFIED PORTION  
OF USER'S FIELD LENGTH (FL) (BY ACTUAL LOCATION)

FUNCTIONAL CATEGORIES: N2

## USAGE

CALL DUMPFL                               \*\* SEE REMARK 1  
CALL DUMPFL (LWA)  
CALL DUMPFL (FWA, LWA)

## DESCRIPTION OF PARAMETERS

FWA - FIRST WORD ADDRESS OF AREA TO DUMP  
(SET TO ZERO IF ANY OF THE FOLLOWING:  
1) FWA OMITTED;  
2) FWA LESS THAN ZERO;  
3) FWA GREATER THAN FL;  
4) FWA GREATER THAN LWA)

LWA - LAST WORD ADDRESS OF AREA TO DUMP  
(SET TO FL IF ONE OF THE FOLLOWING:  
1) LWA OMITTED;  
2) LWA LESS THAN OR EQUAL TO ZERO;  
3) LWA GREATER THAN FL;  
4) FWA GREATER THAN LWA)

## REMARKS

- 1) WHEN CALLED WITHOUT AN ARGUMENT LIST, THE FTN CARD  
FOR THE CALLING PROGRAM MUST HAVE THE 'Z' PARAMETER.
- 2) DUMP IS AT 8 LINES PER INCH ON PRINTERS WHICH WILL PRINT  
AT THAT DENSITY.

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF

OTHERS

EQU60   - LOGICAL ARRAY COMPARE  
FTNRFL   - GET CURRENT FL  
MFETCH   - READ WORD IN USER'S FL

LANGUAGE: FORTRAN IV

## OUTPUT UNITS

UNIT	#	LFN	USE
-----	-----	-----	-----
		OUTPUT	LISTABLE OUTPUT

CM REQUIRED: 401B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATA WRITTEN: 03/12/76

DATE(S) REVISED

06/14/76

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLB USER LIBRARY: NSRDC

SUBROUTINE 'ELLI'  
SUBROUTINE 'CELLI'

PURPOSE

INCOMPLETE AND COMPLETE ELLIPTIC INTEGRALS OF THE FIRST AND  
SECOND KIND

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

CELLI IS AN ENTRY POINT IN ELLI.

WHEN  $ABS(PHI) < \pi/2$ , F AND E ARE ACCURATE TO AT LEAST 10  
SIGNIFICANT FIGURES. AS  $ABS(PHI)$  GETS LARGE, THE ACCURACY  
WILL NOT BE AS GOOD SINCE ELLI USES THE TANGENT SUBROUTINE  
WHICH BECOMES LESS ACCURATE AS THE ANGLE  $ABS(PHI)$  INCREASES.

USAGE

CALL ELLI (PHI, CAY, F, E)  
CALL CELLI (PHI, CAY, F, E)

DESCRIPTION OF PARAMETERS

PHI - UPPER LIMIT OF INTEGRAL  
(NOT USED BY CELLI WHICH ASSUMES  $\pi/2$ )  
CAY - THE PARAMETER IN THE INTEGRAL  
F - OUTPUT THE ELLIPTIC INTEGRAL OF THE FIRST KIND  
(F(PHI,CAY))  
E - OUTPUT THE ELLIPTIC INTEGRAL OF THE SECOND KIND  
(E(PHI,CAY))

CM REQUIRED: 457B (+ 60B FOR LABRT)

ERROR MESSAGES

IF  $K > 1$ , F AND E DO NOT EXIST. A MESSAGE IS PRINTED AND  
F AND E ARE SET TO PHI.

IF  $K=1$  AND  $ABS(PHI) \geq \pi/2$ , F DOES NOT EXIST. A MESSAGE IS  
PRINTED AND F IS SET TO  $SIGN(PHI)*1.0E+294$ . E EXISTS AND IS  
COMPUTED.

OUTPUT UNITS

UNIT #	LFN	USE
-----	-----	-----
	OUTPUT	ERROR MESSAGES PRINTED BY LABRT

METHOD

WHEN  $K < 1$ , LANDEN'S TRANSFORMATION IS USED.

WHEN  $K=1$ , E IS COMPUTED BY:

$$E(\text{PHI}, 1) = N + \text{ABS}(\text{SIN}(\text{PHI}) - \text{SIN}(N \cdot \text{PI}/2))$$

WHERE N IS THE INTEGRAL PART OF  $\text{PHI} \cdot (2/\text{PI})$ .

WHEN  $K=1$  AND  $\text{ABS}(\text{PHI}) < \text{PI}/2$ , F IS COMPUTED BY:

$$F(\text{PHI}, 1) = .5 * \text{LN} \left( \frac{1 + \text{SIN}(\text{PHI})}{1 - \text{SIN}(\text{PHI})} \right)$$

REFERENCE: "HANDBOOK OF MATHEMATICAL FUNCTIONS" BY M. ABRAMOWITZ AND I. A. STEGUN.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

ABS	AIN	ALOG	AMIN1	AMOD
ATAN	FLOAT	INT	MOD	SIGN
SIN	SQRT	TAN		

PART OF LANGUAGE

LABRT - PRINT ERROR MESSAGES

OTHERS

NONE

AUTHORS

KARL J MELENDEZ  
DUANE HARDER  
LOS ALAMOS SCIENTIFIC LABORATORY

VIM ROUTINE LASL C304A

DATE WRITTEN: 02/05/68

DATE(S) REVISED

02/69 - DH

LOCATION OF DECKS

SOURCE

CODE 1892 (LISTING ONLY)

(\*DECK ?)

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'ELTIME'

PURPOSE

OBTAIN CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES SINCE  
LAST CALL

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

REMARKS  
NONE

USAGE

CALL ELTIME (TIMES)

DESCRIPTION OF PARAMETER

TIMES - 7-WORD REAL ARRAY TO CONTAIN THE FOLLOWING:

- 1 - CPA TIME IN SECONDS
- 2 - CPB TIME IN SECONDS
- 3 - CP TIME IN SECONDS (CPA+CPB)
- 4 - PP TIME IN SECONDS
- 5 - IO TIME IN SECONDS
- 6 - WALL CLOCK TIME ( HH.MM.SS. )
- 7 - WALL CLOCK TIME IN SECONDS

CM REQUIRED: 111B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

NONE

OTHERS

- IHMS - CONVERT SECONDS TO ' HH.MM.SS. '
- ISEC - CONVERT HH.MM.SS TO SECONDS
- RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS

R65FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATA WRITTEN: 12/15/75

DATE(S) REVISED

10/31/77 - ADJUST FOR MIDNIGHT

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'EQU60'

PURPOSE

LOGICAL COMPARE (OF 2 ARRAYS)

FUNCTIONAL CATEGORIES: M0

USAGE

TEST = EQU60 (A, B, N)

TEST = EQU60 (A, B)

DESCRIPTION OF PARAMETERS

A,B - COMPARE (ARRAY) A WITH (ARRAY) B

N - NUMBER OF WORDS TO COMPARE  
(IF OMITTED, N=1)

EQU60 - WILL RETURN ONE OF:

-1. IF A .LT. B (DISPLAY CODE)

0. IF A .EQ. B (DISPLAY CODE)

+1. IF A .GT. B (DISPLAY CODE)

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 24B

AUTHOR

C. FLINK - NWL - KPS

DATE WRITTEN: 12/08/70

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS (\*DECK COMPAB)

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'EXPAND'

PURPOSE

EXPAND CHARACTER STRING INTO ARRAY OF 1R-FORMAT WORDS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

SEE SUBROUTINE 'CONTRCT'.

USAGE

CALL EXPAND (A, B, NCHAR)

DESCRIPTION OF PARAMETERS

A - INPUT ARRAY CONTAINING THE CHARACTER STRING  
B - OUTPUT ARRAY WHOSE ELEMENTS WILL EACH CONTAIN ONE  
CHARACTER FROM ARRAY A IN 1R FORMAT  
NCHAR - NUMBER OF CHARACTERS IN ARRAY A

CM REQUIRED: 40B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

NONE

OTHERS

GETCHA - GET CHARACTER FROM ARRAY

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/04/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC



# SUBROUTINE 'EXPRM'

## PURPOSE

EXTRACT PARAMETER FROM CONTROL CARD

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

## REMARKS

ON EACH CALL, THE NEXT PARAMETER IS PASSED FROM RA+70B TO WORD(S) IAD, LEFT JUSTIFIED, ZERO-FILLED. ONCE A TERMINATOR IS ENCOUNTERED OR THE END OF A CARD IS REACHED, ZERO IS RETURNED.

IF CALLED WITH THE SECOND ARGUMENT, RETURNED IN ICC WILL BE A CODE INDICATING THE TYPE OF THE SEPARATOR FOUND FOLLOWING THE PARAMETER RETURNED IN IAD.

## USAGE

CALL EXPRM (IAD)  
CALL EXPRM (IAD, ICC)

## DESCRIPTION OF PARAMETERS

IAD - WILL CONTAIN THE NEXT PARAMETER FROM THE CONTROL CARD. IF TERMINATOR OR END OF CARD, 0 IS RETURNED.

ICC - IF PRESENT, WILL CONTAIN A CODE INDICATING THE TYPE OF SEPARATOR ENCOUNTERED

DEC	OCT	SEPARATOR
1	1	.
2	2	=
3	3	/
4	4	(
5	5	+
6	6	-
7	7	BLANK
8	10B	:
14	16B	OTHER
15	17B	. OR ) (TERMINATOR)

CM REQUIRED: \335B

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF          SHIFT

OTHERS

MFETCH - FETCH WORD IN USER'S FL

AUTHOR

C FLINK - KPS - NWL

DATE WRITTEN: 06/73

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'EXTBIT'

## PURPOSE

EXTRACT BITS FROM A WORD

FUNCTIONAL CATEGORIES: M4

## USAGE

CALL EXTBIT (ISTART, NBITS, IN, IOUT, IRC)

## DESCRIPTION OF PARAMETERS

ISTART - FIRST/ONLY BIT TO EXTRACT  
(BITS ARE NUMBERED 59-0)  
NBITS - NUMBER OF BITS TO EXTRACT (1-60)  
IN - INPUT WORD FROM WHICH BITS ARE TO BE EXTRACTED  
OUT - OUTPUT ARRAY OF DIMENSION NBITS  
IRC - RETURN CODE  
0 - NO ERROR  
1 - ISTART OUT OF RANGE (MUST BE 0-59)  
2 - NBITS OUT OF RANGE (MUST BE 1-60)  
3 - BOTH ISTART AND NBITS OUT OF RANGE

## REMARKS

IF NBITS GOES PAST THE END OF THE WORD, EXTBIT WILL FILL  
WITH ZEROS. THERE IS NO CHECK FOR THIS.

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

MAX0 MIN0 MASK SHIFT

OTHERS

NONE

## ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 44B

## AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/09/75

DATE(S) REVISED

## LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'EXTPRM'

## PURPOSE

EXTRACT NEXT PARAMETER FROM USER-SUPPLIED PARAMETER STRING

## FUNCTIONAL CATEGORIES: M4

## USAGE

```
CALL EXTPRM (IAREA, LAREA, IPARM, ISEP)
CALL EXTPRM (IAREA, LAREA, IPARM)
CALL EXTPRM (0, LAREA)
CALL EXTPRM (0)
```

## DESCRIPTION OF PARAMETERS

IAREA - IN - ARRAY CONTAINING PARAMETER STRING  
LAREA - IN - NUMBER OF WORDS IN 'IAREA'  
OUT - FIRST AND SECOND FORMS OF CALL ONLY:  
0 IF END OF 'IAREA' REACHED  
THIRD FORM OF CALL:  
INITIALIZE FOR THIS MANY WORDS  
FOURTH FORM OF CALL (OMITTED):  
INITIALIZE FOR 16 WORDS  
(BECAUSE 'LAREA' IS BOTH AN INPUT AND OUTPUT  
ARGUMENT, IT MUST ALWAYS BE USED AS A  
VARIABLE, NEVER AS AN EXPLICIT INTEGER.)  
IPARM - OUT - NEXT PARAMETER, LEFT-JUSTIFIED, ZERO-FILLED  
ISEP - OUT - IF PRESENT, CODE INDICATING TYPE OF  
SEPARATOR FOUND FOLLOWING THE PARAMETER  
RETURNED IN 'IPARM' (COMPATIBLE WITH SCOPE  
3.3 AND 3.4)

DEC	OCT	SEPARATOR
1	01	.
2	02	=
3	03	/
4	04	(
5	05	+
6	06	-
7	07	BLANK
8	10	;
14	16	OTHER
15	17	. OR ) (TERMINATOR)

## REMARKS

THE SUBROUTINE IS PRE-INITIALIZED FOR PROCESSING THE FIRST  
USER PARAMETER STRING. IF A SECOND STRING IS TO BE  
PROCESSED, THE SUBROUTINE MUST BE RE-INITIALIZED USING  
EITHER THE THIRD OR FOURTH FORM OF THE CALL.

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF

MINO

SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS  
NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 464B

AUTHORS

C FLINK - KPS NWL  
D V SOMMER - NSRDC CODE 1892.2

DATE WRITTEN: 06/73 - CF

DATE(S) REVISED

04/11/74 - DVS - ORIGINAL SUBROUTINE 'EXPRM' MODIFIED TO  
ACCEPT USER-SUPPLIED PARAMETER STRING

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'FBINRD'

PURPOSE

UNPACK AN INPUT ARRAY

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

CALL FBINRD (BW, NUMB, IN, OUT)

DESCRIPTION OF PARAMETERS

BW - BITS-PER-WORD TO BE EXTRACTED  
NUMB - NUMBER OF BW-BIT OUTPUT WORDS DESIRED  
DIMENSION OF IN IS ((NUMB\*BW)+59)/60  
DIMENSION OF OUT IS NUMB  
IN - INPUT ARRAY  
OUT - OUTPUT ARRAY

CM REQUIRED: 35B

METHOD

THE BW EXTRACTED BITS ARE RIGHT JUSTIFIED WITH LEADING  
ZEROS IN OUT.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHOR

A. CINCOTTA - DTNSRDC CODE 1892.3

DATE WRITTEN: 03/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'FFT'

## PURPOSE

FAST FOURIER TRANSFORM FOR COMPLEX TABULATED FUNCTION

FUNCTIONAL CATEGORIES: E2

LANGUAGE: FORTRAN IV EXTENDED

## REMARKS

THIS ROUTINE ALSO COMPUTES THE INVERSE FOURIER TRANSFORM.  
WITH SLIGHT MODIFICATIONS OF THE RESULTING TRANSFORM, TWO  
REAL TABULATED FUNCTIONS MAY BE TRANSFORMED SIMULTANEOUSLY.

FOR REAL, ONE-DIMENSIONAL DATA, SEE RFFT OR RFSN.

## USAGE

CALL FFT (A, M, INV, S, IFSET, IFERR)

## DESCRIPTION OF PARAMETERS

- A - THE ARRAY CONTAINING A COMPLEX TABULATED FUNCTION OF  
UP TO 3 DIMENSIONS TO BE TRANSFORMED. 'A' CONTAINS  
CONSECUTIVE COMPLEX PAIRS OF DATA. FOR THE ARRAY  
A(I,J,K), THE ELEMENT WITH SUBSCRIPT (I,J,K) IS  
STORED WITH THE REAL PART IN SUBSCRIPT  $2*((K*N1*N2)+$   
 $(J*N1) + I) + 1$ , AND THE IMAGINARY PART IN THE  
FOLLOWING CELL. N1 AND N2 ARE COMPUTED AS  $2**M(1)$   
AND  $2**M(2)$ , RESPECTIVELY. NOTE THAT 'I' VARIES  
MOST RAPIDLY, K LEAST RAPIDLY.  
ON OUTPUT, 'A' CONTAINS THE FOURIER TRANSFORM.
- M - A 3-CELL ARRAY WHICH CONTAINS THE MINIMUM INTEGER  
WHICH IS GE THE LOG-BASE-2 OF THE DIMENSIONS OF 'A'.
- INV - SCRATCH ARRAY REQUIRING 1/8 THE DIMENSION OF 'A'
- S - SCRATCH ARRAY REQUIRING 1/8 THE DIMENSION OF 'A'
- IFSET - COMPUTATION FLAG  
= 0 -- SET UP TABLES IN INV AND S  
= 1 -- SET UP TABLES AND COMPUTE FOURIER TRANSFORM  
=-1 -- SET UP TABLES AND COMPUTE INVERSE FOURIER  
TRANSFORM  
= 2 -- COMPUTE FOURIER TRANSFORM ASSUMING TABLES  
EXIST  
=-2 -- COMPUTE INVERSE FOURIER TRANSFORM ASSUMING  
TABLES EXIST
- IFERR - RETURN CODE  
= 0 -- NORMAL COMPLETION  
<>0 -- ERRORS IN SUBROUTINE ARGUMENTS
- NOTE:  $3 < M(L) < 20$ , WHERE L IS THE SUBSCRIPT OF THE  
LARGEST ELEMENT IN M. DATA DIMENSIONS MUST BE POWERS  
OF 2. IF DATA DIMENSIONS ARE  $< 2**M(L)$ , THE  
REMAINING LOCATIONS MUST BE SET TO ZERO OR ANY  
APPROPRIATE CONSTANT.

CM REQUIRED: 1510B

## METHOD

THIS SUBROUTINE IS BASED ON AN ALGORITHM PROPOSED BY COOLEY AND TUKEY AND IS WELL DOCUMENTED IN REFERENCE 1. BASICALLY, THE ALGORITHM DECOMPOSES THE TRANSFORMATION INTO PRODUCT OF SEVERAL ELEMENTARY TRANSFORMATIONS FOLLOWED BY A REORDERING OF SUBSCRIPTS OF THE RESULT.

A METHOD EXISTS FOR TRANSFORMING 2 REAL DATA SETS SIMULTANEOUSLY WITH AN ELEMENTARY TRANSFORMATION ON THE RESULTING ANSWERS TO SEPARATE THE TRANSFORMS. THIS PROCEDURE IS DOCUMENTED IN REFERENCE 2.

TWO OTHER ROUTINES RFFT AND RFSN ACCOMPLISH THE FAST FOURIER TRANSFORM AND INVERSE TRANSFORM, RESPECTIVELY, OF ONE-DIMENSIONAL DATA. THESE ROUTINES USE A MODIFICATION OF THE COOLEY-TUKEY PROCESS AND ARE FASTER THAN PROCESSING A COMPLEX ARRAY WITH A ZERO IMAGINARY COMPONENT.

## REFERENCES

1. COOLEY, J. W., AND TUKEY, J. W., "AN ALGORITHM FOR THE MACHINE CALCULATION OF COMPLEX FOURIER SERIES," MATH. COMPUT. 19, 90 (APRIL 1965), 297-301.
2. SINGLETON, RICHARD C., "ON COMPUTING THE FAST FOURIER TRANSFORM," COMM. OF THE ACM, VOL. 10, NO. 10, OCTOBER 1967.
3. SYSTEM/360 SCIENTIFIC SUBROUTINE PACKAGE, IBM TECHNICAL PUBLICATIONS DEPARTMENT, 1967.

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

COS	IABS	MAX0	SIN	SQRT
OTHERS				
NONE				

## AUTHORS

WES RICE  
DUANE HARDER  
LOS ALAMOS SCIENTIFIC LABORATORY

VIM ROUTINE LASL C329A

DATE WRITTEN: 07/16/68

DATE(S) REVISED  
02/69 - DH

## LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED: CLIBRARYUPD3.D=HY  
(\*DECK LASC329)

OBJECT

EDITLIB USER LIBRARY: NSRDC



SUBROUTINE 'FFT5'

PURPOSE

FAST FOURIER TRANSFORM

FUNCTIONAL CATEGORIES: E2

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

CALL FFT5 (F, NPTS, KOMPLX)

DESCRIPTION OF PARAMETERS

F - (COMPLEX) ARRAY TO BE TRANSFORMED  
(IF 'F' IS REAL, THE VALUES MUST BE STORED IN  
CONTIGUOUS CORE LOCATIONS)  
NPTS - NUMBER OF WORDS IN 'F' TO BE TRANSFORMED.  
MUST BE POWER OF 2 AND LE 8192.  
TO COMPUTE THE INVERSE TRANSFORM, NPTS MUST  
BE NEGATIVE.  
KOMPLX - ONE OF:  
0 - DATA IN 'F' IS REAL  
1 - DATA IN 'F' IS COMPLEX

CM REQUIRED: 4521B (FFT5) (+ 230B FOR IRVING)

METHOD

SEE CMD-25-71

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE  
COS FLOAT IABS  
PART OF PROGRAM  
IRVING  
OTHERS  
NONE

AUTHORS

W. H. HAILE  
GEORGE GLUCK

DATE WRITTEN: 1971

DATE(S) REVISED

LOCATION OF DECKS

SOURCE  
TAPE LABELLED CLIBRARYUPD3 (DECK: AMFFT5)  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

AD-A103 028

DAVID W TAYLOR NAVAL SHIP RESEARCH AND DEVELOPMENT CE--ETC F/8 9/2  
COMPUTER CENTER CDC LIBRARIES/NSRDC (SUBPROGRAMS).(U)

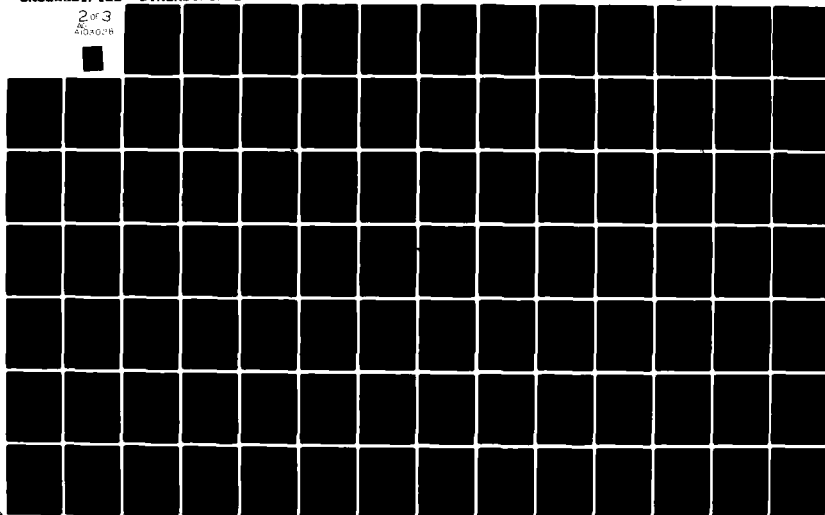
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## SUBROUTINE 'FINDC'

### PURPOSE

FIND PRESENCE OR ABSENCE OF SPECIFIED CHARACTER IN AN ARRAY  
(USER SPECIFIES RELATIONAL OPERAND)

FUNCTIONAL CATEGORIES: M5

### USAGE

CALL FINDC (A, NA, CHAR, NC, NW, REL, FIRSTCH)  
CALL FINDC (A, NA, CHAR, NC, NW, REL)

### DESCRIPTION OF PARAMETERS

A - ARRAY TO BE SEARCHED  
NA - NUMBER OF WORDS IN 'A' TO BE SEARCHED  
CHAR - CHARACTER TO BE SEARCHED FOR ACCORDING TO 'REL'  
(LEFT-ADJ, BLANK- OR ZERO-FILLED -OR-  
RIGHT-ADJ, ZERO-FILLED)  
NC - OUTPUT POSITION OF FIRST CHARACTER (RELATIVE TO  
START OF 'A') WHICH SATISFIES THE RELATION  
'REL' -OR-  
0 - CONDITION IS NOT SATISFIED -OR-  
-1 - 'REL' IS INVALID  
-2 - 'FIRSTCH' GT 10\*NA  
NW - OUTPUT SUBSCRIPT OF WORD CONTAINING POSITION  
'NC' -OR-  
0 - CONDITION IS NOT SATISFIED -OR-  
-1 - 'REL' IS INVALID  
-2 - 'FIRSTCH' GT 10\*NA  
REL - RELATIONAL OPERAND  
"EQ" - FIND FIRST CHARACTER IN 'A' EQUAL TO  
'CHAR'  
"NE" - FIND FIRST CHARACTER IN 'A' NOT EQUAL TO  
'CHAR'  
"LT" - FIND FIRST CHARACTER IN 'A' LESS THAN  
'CHAR'  
"LE" - FIND FIRST CHARACTER IN 'A' LESS THAN OR  
EQUAL TO 'CHAR'  
"GT" - FIND FIRST CHARACTER IN 'A' GREATER THAN  
'CHAR'  
"GE" - FIND FIRST CHARACTER IN 'A' GREATER THAN  
OR EQUAL TO 'CHAR'  
FIRSTCH - FIRST CHARACTER TO BE SEARCHED (OPTIONAL)  
(DEFAULT: 1)  
IF FRSTCH < 1, DEFAULT IS USED.

REMARKS  
NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

LOCF  
OTHERS  
GETCHA - GET CHARACTER FROM ARRAY

ARITHMETIC STATEMENT FUNCTIONS

L11FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)  
L21FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)  
R11FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

LANGUAGE: FORTRAN IV

CM REQUIRED: 261B

AUTHORS

DAVID V SOMMER - DTNSRDC CODE 1892.2  
PETE ROTH - DTNSRDC CODE 1720.3

DATA WRITTEN: 04/20/76

DATE(S) REVISED

07/22/76 - PR/DVS - ADD PARAMETER 'FIRSTCH'

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'FINDW'

## PURPOSE

FIND PRESENCE OR ABSENCE OF SPECIFIED WORD IN AN ARRAY  
(USER SPECIFIES RELATIONAL OPERAND)

FUNCTIONAL CATEGORIES: M5

## USAGE

CALL FINDW (A, NA, W, NW, REL)

## DESCRIPTION OF PARAMETERS

A - ARRAY TO BE SEARCHED  
NA - NUMBER OF WORDS IN 'A' TO BE SEARCHED  
W - WORD TO BE TESTED FOR ACCORDING TO 'REL'  
NW - OUTPUT POSITION (SUBSCRIPT) OF FIRST WORD IN 'A'  
WHICH SATISFIES THE RELATION 'REL' -OR-  
0 - CONDITION IS NOT SATISFIED -OR-  
-1 - 'REL' IS INVALID  
REL - RELATIONAL OPERAND  
"EQ" - FIND FIRST WORD IN 'A' WHICH IS EQUAL TO 'W'  
"NE" - FIND FIRST WORD IN 'A' WHICH IS NOT EQUAL TO  
'W'  
"LT" - FIND FIRST WORD IN 'A' WHICH IS LESS THAN 'W'  
"LE" - FIND FIRST WORD IN 'A' WHICH IS LESS THAN OR  
EQUAL TO 'W'  
"GT" - FIND FIRST WORD IN 'A' WHICH IS GREATER THAN  
'W'  
"GE" - FIND FIRST WORD IN 'A' WHICH IS GREATER THAN  
OR EQUAL TO 'W'

## REMARKS

NONE

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

## ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 201B

## AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/20/76

DATE(S) REVISED

## LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

08/22/77

2-75

FINDW - 1 OF 1

SUBROUTINE 'FINDWRD'  
SUBROUTINE 'FINDWR'

PURPOSE  
FIND SPECIFIED WORD IN AN ARRAY

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV

USAGE  
CALL FINDWRD (A, NA, WORD, NWORD)  
CALL FINDWR (A, NA, WORD, NWORD)

DESCRIPTION OF PARAMETERS  
A - ARRAY TO BE SEARCHED  
NA - NUMBER OF WORDS IN 'A' TO BE SEARCHED  
WORD - WORD TO BE SEARCHED FOR  
NWORD - OUTPUT SUBSCRIPT OF FIRST OCCURRENCE OF WORD  
IN 'A' (IF NO MATCH, ZERO (0) IS RETURNED)

REMARKS  
ON CDC 6000, USE 'FINDWRD'. ON BURROUGHS B7700, USE  
'FINDWR'. A CDC 6000 PROGRAM USING 'FINDWRD' NEED NOT  
CHANGE WHN MOVING TO THE B7700, SINCE NAMES ARE TRUNCATED  
TO 6 CHARACTERS AUTOMATICALLY.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
NONE  
OTHERS  
NONE

CM REQUIRED: B7700: EST 48 WORDS  
CDC : 40B

AUTHOR  
DAVID V SOMMER - NSRDC CODE 1892.2

DATE WRITTEN: 07/08/74

DATE(S) REVISED  
05/07/79 - MOVE TO BURROUGHS B7700

LOCATION OF DECKS  
SOURCE  
B7700: \*SOURCE/NSRDC/FINDWR  
CDC : UPDATE LIBRARY: NSRDCPL, ID=CSYS  
OBJECT  
B7700: \*NSRDC/FINDWR  
CDC : EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'FRESNEL'

PURPOSE

EVALUATE FRESNEL INTEGRALS

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

REMARKS

$C(X) = \text{INTEGRAL (FROM 0 TO X) } \cos((\pi/2)U^{**2})DU$

$S(X) = \text{INTEGRAL (FROM 0 TO X) } \sin((\pi/2)U^{**2})DU$

RELATIVE ERROR < 2.E-10.

USAGE

CALL FRESNEL (X, C, S)

DESCRIPTION OF PARAMETERS

X - REAL INPUT PARAMETER

C - REAL OUTPUT PARAMETER (C(X))

S - REAL OUTPUT PARAMETER (S(X))

CM REQUIRED: 271B

METHOD

TRUNCATED CHEBYSHEV SERIES

REFERENCE

BULIRSCH, R., "NUMERICAL CALCULATION OF THE SINE, COSINE AND FRESNEL INTEGRALS", NUMERISCHE MATHEMATIK, 9, 1967, PP. 380-385.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

ABS	AIN	COS	FLOAT	SIN
OTHERS				
NONE				

AUTHOR

R BULIRSCH - UNIVERSITY OF CALIFORNIA AT SAN DIEGO

DATE WRITTEN: 01/68

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

TAPE LABELLED: CLIBRARYUPD3

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'FTNRFL'

PURPOSE

GET/SET CORE SIZE

FUNCTIONAL CATEGORIES: Q0

USAGE

CALL FTNRFL (IFL)

DESCRIPTION OF PARAMETER

IFL - INTEGER FIELD LENGTH DESIRED.

IF THE VALUE OF IFL IS ZERO (0), THE FL IS NOT CHANGED  
BUT THE PRESENT FIELD LENGTH IS RETURNED IN IFL.

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 20B

AUTHOR

C FLINK - KPS NWL

DATE WRITTEN: 12/18/70

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC



FUNCTION 'GAMCAR'

PURPOSE

COMPLEX GAMMA FUNCTION OF A COMPLEX ARGUMENT HAVING POSITIVE  
REAL PART

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

REMARKS

HAS BEEN CHECKED FOR  $CX = A + BI$ ,  $0 < A \leq 20$ ,  $0 < B \leq 20$ .  
RELATIVE ERROR IS  $\leq 2 \cdot 10^{-10}$ .

USAGE

COMPLEX CX, CY, GAMCAR

$CY = GAMCAR(CX)$

DESCRIPTION OF PARAMETERS

CX - COMPLEX VARIABLE WITH POSITIVE REAL PART  
CY - COMPLEX SOLUTION

CM REQUIRED: 233B

METHOD

$GAMCAR(Z+1) = (Z+5.5)^{(Z+1/2)} * E^{-(Z+5.5)} * \sqrt{2*PI} * (CONSTANT + \sum_{I=1,6} (CI/Z+I))$   
WHERE CONSTANT = 1.00000 00001 78  
C(1) = 76.18009 17294 06  
C(2) = -86.50532 03271 12  
C(3) = 24.01409 82222 3  
C(4) = -1.23173 95161 4  
C(5) = 0.00120 85800 3  
C(6) = -0.00000 53638 2

REFERENCES

C. LANCZOS, NUMERICAL ANALYSIS, SIAM SERIES B, VOL I, PP.  
86-96, 1964.

HANDBOOK OF MATHEMATICAL FUNCTIONS, NATIONAL BUREAU OF  
STANDARDS, APPLIED MATHEMATICS SERIES NO. 55.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE  
CEXP CLOG  
OTHERS  
NONE

AUTHORS

R L PEXTON - LAWRENCE RADIATION LABORATORY  
D A WILBER - LAWRENCE RADIATION LABORATORY

DATE WRITTEN: 12/16/64 (RLP)

DATE(S) REVISED  
08/65 (DAW)

LOCATION OF DECKS

SOURCE

TAPE LABELLED: CLIBRARYUPD3

OBJECT

NSRDC

FUNCTION 'GAMMA'

PURPOSE  
INCOMPLETE GAMMA FUNCTION

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

REMARKS  
COMPUTES GAMMA (A, X) UNDER THE FOLLOWING RESTRICTIONS:  
1)  $X \geq 0$ ,  
2) WHEN  $X = 0$ , A IS NOT A NON-POSITIVE INTEGER.

USAGE  
 $Y = \text{GAMMA}(A, X)$

DESCRIPTION OF PARAMETERS  
A - FLOATING POINT NUMBER  
X -  $\geq 0$  (X=0 FOR COMPLETE GAMMA FUNCTION)

CM REQUIRED: 557B (INCLUDES GAMNEG/GCHEB/GFRAC/GSERIES)

REFERENCE  
C. E. FROBERG, RATIONAL CHEBYCHEV APPROXIMATION OF  
ELEMENTARY FUNCTIONS, BIT. VOL. 1, P. 256, 1961.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

ABS ALOG SQRT

PART OF PROGRAM

GAMNEG - COMPUTES GAMMA(A,X) WHEN A IS NEGATIVE INTEGER  
(DUE TO THE REPRESENTATION OF NUMBERS IN THE  
6600, IF  $A = -N + E$ , WHERE  $E < 1.0E-10$ , THEN A IS  
TAKEN TO BE A NEGATIVE INTEGER)

GCHEB - COMPUTES BY A RATIONAL CHEBYSHEV APPROXIMATION  
(GAMMA(A))

GFRAC - COMPUTES THE CONTINUED FUNCTION FOR GAMMA(A,X)

GSERIES - COMPUTES  $\sum_{N=0, \infty} ((-X)**N)/((A+N)N!)$

OTHERS

NONE

AUTHOR  
HARVEY ABRAMSON - NEW YORK UNIVERSITY

DATE WRITTEN: 05/15/66

DATE(S) REVISED  
05/67

LOCATION OF DECKS  
SOURCE  
CODE 1892.1  
OBJECT  
NSRDC

# SUBROUTINE 'GAUSS'

## PURPOSE

GAUSSIAN ELIMINATION WITH PARTIAL PIVOTING FOR SOLVING  
AX=B WHERE B MAY BE A SYSTEM OF M RIGHT-HAND SIDES

FUNCTIONAL CATEGORIES: F4 F3

LANGUAGE: FORTRAN IV

## REMARKS

IF A-INVERSE IS DESIRED; ANX=0B IN! WILL YIELD  
THE SOLUTION TO AX=B AS WELL AS THE INVERSE.

IF MM=0. XX CONTAINS RESULT OF FIRST GAUSSIAN ELIMINATION.

## USAGE

CALL GAUSS (N, M, AA, BB, XX, VAL2, DET, MM)

## DESCRIPTION OF PARAMETERS

N - SIZE OF MATRIX AA  
M - NUMBER OF COLUMNS IN BB (<=51)  
(NUMBER OF RIGHT HAND SIDES)  
AA - MATRIX (51X51)  
BB - RIGHT HAND SIDE(S) (51X51)  
XX - SOLUTION VECTORS (51X51)  
VAL2 - FINAL MAXIMUM ROW SUM OF RESIDUALS  
(INFINITY-NORM OF RESIDUAL)  
DET - DETERMINANT  
MM - NUMBER OF ITERATIONS ON RESIDUALS  
INPUT - MAXIMUM NUMBER TO BE PERMITTED  
OUTPUT - NUMBER ACTUALLY DONE

CM REQUIRED: 17714B

## REFERENCE:

WILKINSON, J. H., ROUNDING ERRORS IN ALGEBRAIC PROCESSES.

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

ABS

OTHERS

NONE

## AUTHORS

ROBERT MARGOLIS - UNIVERSITY OF MARYLAND  
SUSAN VOIGHT - DTNSRDC

DATE WRITTEN: 1971

DATE(S) REVISED

## LOCATION OF DECKS

SOURCE

TAPE LABELLED: CLIBRARYUPD3 (DECKNAME: AMGUA2)

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'GETCHA'  
FUNCTION 'GETCHA'

PURPOSE

EXTRACT CHARACTER FROM SPECIFIED POSITION IN AN ARRAY

FUNCTIONAL CATEGORIES: M4 M5

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS

CDC 6000

USAGE

CALL GETCHA (ARRAY, NPOS, ICHAR)  
VARIABLE = GETCHA (ARRAY, NPOS, ICHAR)

DESCRIPTION OF PARAMETERS

ARRAY - ARRAY FROM WHICH CHARACTER IS TO BE EXTRACTED  
NPOS - POSITION OF CHARACTER TO BE EXTRACTED  
(POSITION 1 IS LEFT-MOST 6-BIT CHARACTER IN  
ARRAY(1))  
ICHAR - WILL CONTAIN THE EXTRACTED CHARACTER IN 1R FORMAT  
(RIGHT-ADJ, ZERO-FILLED)  
GETCHA - WHEN USED AS A FUNCTION, GETCHA WILL CONTAIN THE  
SAME AS ICHAR AND MUST BE DECLARED INTEGER IN THE  
CALLING PROGRAM

CM REQUIRED: 52B

REMARKS

SIMILAR TO FUNCTION 'GETCHC' ON THE BURROUGHS B7700.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE  
MOD SHIFT  
OTHERS  
NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/16/76

DATE(S) REVISED

08/01/79 - DOCUMENT MODIFIED

LOCATION OF DECKS

SOURCE  
UPDATE LIBRARY: NSRDCPL.ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'GETCHR'  
FUNCTION 'GETCHR'

PURPOSE

EXTRACT CHARACTER FROM SPECIFIED POSITION IN A WORD

FUNCTIONAL CATEGORIES: M4 M5

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS

CDC 6000

USAGE

CALL GETCHR (WORD, NPOS, ICHAR)  
VARIABLE = GETCHR (WORD, NPOS, ICHAR)

DESCRIPTION OF PARAMETERS

WORD - WORD FROM WHICH CHARACTER IS TO BE EXTRACTED  
NPOS - POSITION OF CHARACTER TO BE EXTRACTED  
(POSITION 1 IS LEFT-MOST 6-BIT CHARACTER IN WORD)  
ICHAR - WILL CONTAIN THE EXTRACTED CHARACTER IN 1H FORMAT  
(LEFT-ADJ, BLANK-FILLED)  
GETCHR - WHEN USED AS A FUNCTION, GETCHR WILL CONTAIN THE  
SAME AS ICHAR AND MUST BE DECLARED INTEGER IN THE  
CALLING PROGRAM

CM REQUIRED: 43B

REMARKS

GETCHA' ON THE BURROUGHS B7700 IS SIMILAR, BUT EXTRACTS  
FROM AN ARRAY.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

AUTHOR

FROM BIMED PACKAGE

DATE WRITTEN: 03/16/76

1975 - DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE(S) REVISED

08/01/79 - DOCUMENT MODIFIED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'GETFIT'

PURPOSE

GET SPECIFIED FIT ADDRESS

FUNCTIONAL CATEGORIES: Q0

USAGE

CALL GETFIT (LFN, ADDR)

DESCRIPTION OF PARAMETERS

LFN - LOCAL FILE NAME  
(LEFT-JUSTIFIED, ZERO-FILLED)  
(E.G., 5LTAPE1)

ADDR - WILL CONTAIN THE FIT ADDRESS

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

LANGUAGE: COMPASS

CM REQUIRED: 25B

AUTHOR

ANTHONY CINCOTTA - NSRDC CODE 1892.3

DATE WRITTEN: 03/20/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'GETHOUR'

PURPOSE

FOR A SPECIFIED PERIOD OF TIME (UP TO 2 HR 59 MIN 59 SEC)  
DETERMINE WHICH HOUR IS OCCUPIED THE LONGEST

FUNCTIONAL CATEGORIES: M2

USAGE

CALL GETHOUR (FROM, TO, HOUR)

DESCRIPTION OF PARAMETERS

FROM - STARTING TIME ('HH.MM.SS ' , ' HH.MM.SS ' OR  
          ' HH.MM.SS' )  
TO - STOPPING TIME (SAME FORMAT AS 'FROM' )  
HOUR - WILL CONTAIN AN INTEGER HOUR  
      0 - TIME PERIOD TOO LONG TO DETERMINE HOUR  
      N - MOST/ALL TIME IS IN THE HOUR N-1 TO N  
          (E.G., HOUR=8 MEANS MOST/ALL TIME IS IN  
          THE HOUR 7-8)

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND SHIFT

OTHERS

ISEC - CONVERT HH.MM.SS TO SECONDS

ARITHMETIC STATEMENT FUNCTIONS

I21FMT - FAST I-FORMAT DECODE

L11FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

LANGUAGE: FORTRAN IV

METHOD

THE HOURS IN FROM (HF) AND TO (HT) ARE COMPARED.  
IF EQUAL, HOUR IS SET TO HT+1.  
IF THE DIFFERENCE IS 1, THE AMOUNT OF TIME SPENT IN EACH  
HOUR IS COMPARED AND THE HOUR IS SET TO THE LARGER+1.  
IF AN EQUAL AMOUNT OF TIME IS SPENT IN EACH HOUR, HOUR IS  
SET TO HT+1.  
IF THE DIFFERENCE IS 2, HOUR IS SET TO THE MIDDLE HOUR+1.

CM REQUIRED: 121B



AUTHOR  
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/23/76

DATE(S) REVISED  
11/16/76

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'GETLFNS'

## PURPOSE

GET ACTUAL LOCAL FILE NAMES (FOR FTN)

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

## REMARKS

USEFUL ONLY IN FTN PROGRAMS (WHICH ALLOW FILE NAME REPLACEMENT IN THE 'LGO' CARD).

## USAGE

CALL GETLFNS (LFNS, NLFN)  
CALL GETLFNS (LFNS)

## DESCRIPTION OF PARAMETERS

LFNS - ARRAY DIMENSIONED AT LEAST 1 GREATER THAN NUMBER OF FILES (INCLUDING EQUATED FILES) ON FTN PROGRAM STATEMENT

(LFNS(NLFN) WILL BE SET TO 0)

NLFN - IF PRESENT, WILL RETURN NUMBER OF FILE NAMES + 1 (SUBSCRIPT OF FINAL ZERO-WORD IN ARRAY LFNS)

CM REQUIRED: 33B

## EXAMPLES

PROGRAM SAMPLE (INPUT,OUTPUT,TAPE1,TAPE5=INPUT,TAPE6=OUTPUT)  
DIMENSION LFN(6)  
CALL GETLFNS (LFN, NLFN)  
...

EXECUTE CARD:	LGO.	LGO.,OUT,TAPE2.
AFTER CALL:	LFN(1) = 5LINPUT	LFN(1) = 5LINPUT
	LFN(2) = 6LOUTPUT	LFN(2) = 3LOUT
	LFN(3) = 5LTAPE1	LFN(3) = 5LTAPE2
	LFN(4) = 5LINPUT	LFN(4) = 5LINPUT
	LFN(5) = 6LOUTPUT	LFN(5) = 3LOUT
	LFN(6) = 0	LFN(6) = 0
	NLFN = 6	NLFN = 6

## METHOD

FILE NAMES FROM PROGRAM CARD ARE IN RA+2 ON. EACH HAS A POINTER TO ITS FIT. THE FIRST WORD OF EACH FIT IS THE ACTUAL FILE NAME. THE LIST, STARTING IN RA+2, ENDS IN A WORD OF ZEROS.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
AND LOCF  
OTHERS  
NONE

ARITHMETIC STATEMENT FUNCTIONS  
L71FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)  
R38FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR  
DAVID V SOMMER - NSRDC CODE 1892.2

DATE WRITTEN: 12/30/74

DATE(S) REVISED  
12/29/75  
10/20/77 - REWRITE TO REDUCE CM REQUIREMENT AND ELIMINATE  
SPECIAL FUNCTION CALL

LOCATION OF DECKS  
SOURCE  
UPDATE LIBRARY: NSRDCPL,ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'GETLGO'

PURPOSE

EXTRACT FIRST 10 CHARACTERS OF ALL EXECUTE CARD  
PARAMETERS

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

CALL GETLGO (LGO, NLGO)

DESCRIPTION OF PARAMETERS

LGO - ARRAY TO CONTAIN EXECUTE CARD PARAMETERS  
LGO(1) CONTAINS EXECUTE NAME  
LGO(2)-LGN(NLGO) CONTAIN FIRST 10 CHARACTERS  
OF EACH PARAMETER (0 MEANS PARAMETER OMITTED)  
NLGO - NUMBER OF WORDS OF LGO FILLED

CM REQUIRED: 36B

METHOD

PARAMETERS ARE EXTRACTED FROM RA+70B THRU RA+77B.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

EXPRM - GET NEXT PARAMETER FROM EXECUTE CARD

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 09/01/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'GETLIB'

PURPOSE

GET SYSTEM LIBRARY NAME FROM CODE IN CONTROL POINT AREA

FUNCTIONAL CATEGORIES: M5 S0 Q0

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS

CDC 6000

REMARKS

THIS ROUTINE MUST BE REVERIFIED EACH TIME THE NOS/BE SYSTEM CHANGES.

USAGE

INTEGER GETLIB  
LIB = GETLIB (WHICH)

DESCRIPTION OF PARAMETERS

WHICH - CONTAINS A 1-CHARACTER CODE FOR THE LIBRARY  
(THIS IS IN CONTROL POINT AREA + 055B THRU 057B)  
GETLIB - WILL CONTAIN ONE OF:  
-1 -- 'WHICH' WAS INVALID  
0 -- END OF THE LIBRARY LIST  
<LIB> -- A SYSTEM LIBRARY NAME (1-7 CHARACTERS)  
<BLANKS> -- THE USER LIBRARY NAME IS IN CPA+056B  
OR 057B

CM REQUIRED: 44B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 09/24/80

DATE(S) REVISED

02/06/81 - REMOVE RUN2P3 AND RE-ARRANGE

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'GETRA'

PURPOSE

GET FIRST 100B WORDS OF USER'S FL

FUNCTIONAL CATEGORIES: K2

LANGUAGE: CDC 6000 CP COMPASS

REMARKS

NONE

USAGE

CALL GETRA (RA)

DESCRIPTION OF PARAMETER

RA - 64-WORD ARRAY TO HOLD FIRST 100B WORDS OF FL

CM REQUIRED: 7B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/03/73

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'GODROP'

PURPOSE

CREATE GO/DROP MESSAGE AND PROCESS RESPONSE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NOT DESIGNED FOR BATCH JOBS.

IN INTERCOM, WILL GENERATE MESSAGE AT THE TERMINAL, NOT AT THE CENTRAL SITE CONSOLE.

WHEN USED WITH NO ARGUMENT LIST, THE 'Z' PARAMETER MUST BE USED ON THE FTM CARD.

USAGE

CALL GODROP (MESSAGE)

CALL GODROP

DESCRIPTION OF PARAMETER

MESSAGE - IF USED, CONTENTS WILL BE DISPLAYED (SHOULD BE A ZERO-BYTE TERMINATED FIELD)  
IF OMITTED, THE MESSAGE IS TAKEN FROM RA+70B THRU RA+77B AND PREFIXED WITH 'GO/DROP- '. THE MESSAGE MAY BE INSERTED BY  
'CALL PUTRA (MESSAGE, 70B, 76B)'

CM REQUIRED: 142B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF           REMARK

OTHERS

MFETCH   - READ A WORD IN USER'S FL

MSET      - SET WORD IN USER'S FL

AUTHOR

C FLICK - KPS NWL

DATE WRITTEN: 06/73

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY:   NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY:   NSRDC

SUBROUTINE 'HELP'

PURPOSE

COMPLEX ROOTS OF A REAL OR COMPLEX POLYNOMIAL

FUNCTIONAL CATEGORIES: C2

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

CALCULATES THE ROOTS OF THE COMPLEX POLYNOMIAL

$FN(Z) = A(N)*Z**(N) + A(N-1)*Z**(N-1) + \dots + A(1)*Z + A(0)$   
WHERE  $A(I)$  ( $I=0,1,\dots,N$ ) ARE PSEUDO-COMPLEX COEFFICIENTS.

USAGE

CALL HELP (N, A, ROOT, TAU, ETAI, MI)

DESCRIPTION OF PARAMETERS

N - DEGREE OF POLYNOMIAL  
(DESTROYED BY HELP)  
A - ARRAY OF N+1 COEFFICIENTS (SEE NOTE)  
(DESTROYED BY HELP)  
ROOT - ARRAY TO CONTAIN THE N ROOTS (SEE NOTE)  
TAU - THE TOLERANCE TO BE PRESCRIBED FOR  $FN(ROOT(I))$   
( $ROOT(I)$  WOULD BE CONSIDERED AS A ROOT WHEN  
 $ABS(FN(ROOT(I))) \leq TAU$   
IN THE SCALE OF THE SYSTEM OF COORDINATES  
CONSIDERED AT THE MOMENT)  
ETA1 - INDICATOR ARRAY  
ETA1(I)=+1 --  $ABS(FN(ZI)) \leq TAU$   
= 0 -- DID NOT FIND A NEW CIRCLE  
=-1 -- INCREMENTING THE ROOT BY NU DID NOT  
CHANGE THE ROOT (BECAUSE OF MACHINE  
LIMITS)  
MI - INDICATOR VECTOR

NOTE: ARRAYS 'A' AND 'ROOT' ARE 2-DIMENSIONAL REAL ARRAYS  
 $A(N+1,2)$ ,  $ROOT(N,2)$ , WHERE  $A(I,1)$ ,  $ROOT(I,1)$  ARE THE  
REAL PARTS AND  $A(I,2)$ ,  $ROOT(I,2)$  ARE THE IMAGINARY  
PARTS.

CM REQUIRED: 1471B

METHOD

THE METHOD OF D. H. LEHMER (JOURNAL ACM, 1961, VOL 8,  
P. 151) IS USED.



SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE  
ABS SIN SQRT  
PART OF PROGRAM  
ANSWER (437B)  
ANULUS (117B)  
COMADD (13B)  
COMMUL (14B)  
DIVIDE (52B)  
FUNC (53B)  
OVLAP (214B)  
OTHERS  
NONE

AUTHORS

ADEL S. ABDELGAWAD  
G. MIEDEL  
DEUTSCHES RECHENZENTRUM

SHARE PROGRAM NUMBER 3400

DATE WRITTEN: 11/64

DATE(S) REVISED  
11/18/65 - GM

LOCATION OF DECKS

SOURCE  
UPDATE LIBRARY ON TAPE LABELLED: CLIBRARYUPD3,D=HY  
(\*DECK ZFHELP)

OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'HERE'  
FUNCTION 'HERE'

PURPOSE

GET TERMINAL ID FOR THIS JOB

FUNCTIONAL CATEGORIES: QO

USAGE

CALL HERE (I)  
VARIABLE = HERE (I)

DESCRIPTION OF PARAMETERS

I - WILL CONTAIN THE TERMINAL ID, LEFT-JUSTIFIED,  
ZERO-FILLED (1LC = CENTRAL SITE)  
(WHEN USED AS A FUNCTION, 'HERE' WILL CONTAIN THE SAME AS  
'I'. 'VARIABLE' AND 'HERE' MUST BE OF THE SAME TYPE.)

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND SHIFT

OTHERS

RCPA - READ CONTROL POINT AREA

UNHEX3 - CONVERT 2-CHAR DISPLAY CODE TO 3-CHAR HEX

ARITHMETIC STATEMENT FUNCTIONS

L25FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

LANGUAGE: FORTRAN IV EXTENDED

METHOD

THE TERMINAL ID IS TAKEN FROM CONTROL POINT AREA.  
IF THIS FIELD IS ZERO, IT IS A CENTRAL SITE JOB. IN THIS  
CASE, 1LC IS RETURNED.

CM REQUIRED: 31B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/05/75

DATE(S) REVISED

10/01/78 - CHANGE FOR 3-CHARACTER TERMINAL ID

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'HEX3'

PURPOSE

SQUEEZE 3-CHARACTER HEX INTO 12 BITS

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

'HEX3' IS AN INTEGER FUNCTION.

WRITTEN TO CHANGE USER-SUPPLIED 3-CHARACTER HEX TERMINAL ID  
TO THE FORM NEEDED BY THE CALLABLE ROUTE.

USAGE

I = HEX3 (HEXVAL)

DESCRIPTION OF PARAMETERS

HEXVAL - INPUT HEX VALUE (E.G., 3LF04)

HEX3 - OUTPUT IN FIRST 2 CHARACTERS (E.G., 2L@D)

CM REQUIRED: 60B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND

OR

SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

R11FMT

R12FMT

R13FMT

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 09/19/78

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'IAOC'

PURPOSE  
COUNT ONE-BITS IN SPECIFIED WORD

FUNCTIONAL CATEGORIES: G6

LANGUAGE: CDC 6000 CP COMPASS

REMARKS  
NONE

USAGE  
N = IAOC (I)

DESCRIPTION OF PARAMETERS  
I - WORD TO BE PROCESSED  
IAOC - NUMBER OF ONE-BITS

CM REQUIRED: 2B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
NONE  
OTHERS  
NONE

AUTHOR  
FROM NWL

DATE WRITTEN:

DATE(S) REVISED

LOCATION OF DECKS  
SOURCE  
UPDATE LIBRARY: NSRDCPL, ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'IBL'  
FUNCTION 'IBL'

PURPOSE

CALCULATE BEST BLOCK LENGTH (MIN TIME REQ'D FOR RANDOM  
ACCESS AND MINIMUM BUFFER SIZE) FOR INDEX SEQUENTIAL FILES

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV

REMARKS

THIS SUBROUTINE CALCULATES BEST BLOCK LENGTHS FOR INDEX SEQ  
FILES BASED ON EITHER VALUES ESTABLISHED IN A FIT OR A SIX  
WORD TABLE. IF INPUT IS A FIT, THIS ROUTINE WILL SET FIT  
FIELDS MBL AND IBL TO THE VALUE IT CALCULATES. A SHORT  
(5 LINE) REPORT CAN BE PRINTED DEPENDING ON THE VALUE OF  
THE SECOND PARAMETER PASSED TO IBL.

SEVERAL ASSUMPTIONS ARE MADE IN DERIVING THE FORMULA THIS  
SUBROUTINE USES. AMONG THESE ARE:

1. GENERAL INDEX-SEQ PROCESSING IS ASSUMED.  
IF THE FILE IS PROCESSED RANDOMLY ONLY, FILE ORGANIZA-  
TIONS OTHER THAN INDEX-SEQ PROVIDE BETTER PERFORMANCE.  
IF THE FILE IS ACCESSED HEAVILY SEQUENTIALLY THIS  
CALCULATION MAY NOT PROVIDE THE OPTIMUM SIZE.
2. EQUAL LENGTH DATA AND INDEX BLOCKS ARE ASSUMED TO ALLOW  
SHARING OF BUFFER AREAS.
3. BLOCK SIZE SHOULD BE OF MINIMAL LENGTH WHICH ALLOWS THE  
FILE TO BE FILLED TO CAPACITY INCLUDING PADDING.
4. BUFFER SPACE IS KEPT NEARLY MINIMAL AND RANDOM ACCESS  
TIME IS KEPT NEARLY MINIMAL.

THE ROUTINE IS BASED ON AN ARTICLE PUBLISHED IN CONTROL  
DATA PSI EXCERPTS (NO. 109 - OCTOBER 1977).

THE ROUTINE CANNOT BE USED IF RESULTING BLOCK LENGTH IS  
SMALLER THAN MAX REC LENGTH. IT SHOULD NOT BE USED IF  
RECORD TRUNCATION RESULTS IN EXCESSIVE PADDING IN THE  
DATA BLOCKS.

THE TIMINGS IN THE OUTPUT REPORT ARE BASED ON THE  
ASSUMPTION OF:

ACCESS TIME (POSITION + LATENCY) = 30 MS  
TRANSFER TIME = 1 MS/PRU  
CP TIME TO PROCESS THE REQUEST = 1 MS

SO TOTAL TIME = 1 + (NO. INDEX LEVELS)\*(30+NPRUS)

USAGE

FORTRAN CALLING SEQUENCES

CALL IBL (FIT, IFLAG)

IBLKSZ = IBL (FIT, IFLAG)

COBOL CALLING SEQUENCE

ENTER IBL USING FIT, IFLAG.

FIT        - FILE INFORMATION TABLE -OR-  
            A SIX-WORD INTEGER ARRAY CONTAINING:  
            FLM     MAX RECORDS IN THE FILE  
            RL     AVERAGE RECORD LENGTH  
            KL     KEY LENGTH  
            IP     INDEX PADDING PERCENT  
            DP     DATA PADDING PERCENT  
            MRL    MAX RECORD LENGTH

IFLAG     - PRINTOUT FLAG  
            "Y"    - PRINT 5-LINE REPORT  
            OTHER - DO NOT PRINT

IBL        - WHEN USED AS A FORTRAN FUNCTION, IBL RETURNS  
            THE COMPUTED BLOCK SIZE

CM REQUIRED: 363B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

IFETCH     STOREF

OTHERS

NONE

AUTHOR

ACQUIRED FROM AUTHOR OF CDC PSI ARTICLE

MODIFIED BY BRUCE D. BLACK - DTNSRDC CODE 1892.1 (CDC)

DATE WRITTEN: 04/03/78

DATE(S) REVISED

04/03/78 - ADD OPTION TO TURN OFF PRINT OF REPORT

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'IBUNP'

PURPOSE

UNPACK 12-BIT BYTES FROM ARRAY

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC 6000 CP COMPASS

REMARKS

NONE

USAGE

CALL IBUNP (A1, A2, N)

DESCRIPTION OF PARAMETERS

A1 - INPUT ARRAY FROM WHICH BYTES ARE UNPACKED

A2 - OUTPUT ARRAY INTO WHICH BYTES ARE PLACED,  
1 BYTE PER WORD, RIGHT JUSTIFIED, WITH LEADING ZEROS

N - NUMBER OF CDC WORDS TO UNPACK

DIMENSION OF A1 IS N

DIMENSION OF A2 IS 5\*N

CM REQUIRED: 12B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHOR

FROM NWL

DATE WRITTEN:

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'IDAYWEK'

PURPOSE

DETERMINE THE DAY OF THE WEEK FOR ANY DATE FROM 10/15/1582  
THRU 02/28/4000

FUNCTIONAL CATEGORIES: G6

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

IDAY = IDAYWEK (IDATE, ICENT)  
IDAY = IDAYWEK (IDATE)

DESCRIPTION OF PARAMETERS

IDATE - DATE TO BE PROCESSED ('MM/DD/YY' OR 'MM/DD/YY'  
OR 'MM/DD/YY')  
(IF IDATE = 0, TODAY'S DATE WILL BE USED; IDATE  
WILL BE SET TO TODAY'S DATE 'MM/DD/YY')  
ICENT - CENTURY (E.G., 1900)  
IF OMITTED, 1900 IS ASSUMED.  
IDAYWEK - WILL CONTAIN THE DAY OF THE WEEK IN A-FORMAT  
(E.G., 'SUNDAY')

CM REQUIRED: 104B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE  
AND DATE LOCF SHIFT  
OTHERS  
WEKDAY - DETERMINE DAY OF WEEK

ARITHMETIC STATEMENT FUNCTIONS

FAST I-FORMAT DECODE  
I21FMT I24FMT I27FMT  
FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)  
L11FMT

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/06/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE  
UPDATE LIBRARY: NSRDCPL.ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC



SUBROUTINE 'IDID'  
FUNCTION 'IDID'

PURPOSE

GET USER INITIALS (AND INTERCOM USER ID) FROM CHARGE CARD  
OR LOGIN

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

IF USER INITIALS AND USER ID ARE EQUAL, IT IS A BATCH JOB.

USAGE

CALL IDID (ID, IUSERID)  
CALL IDID (ID)  
IID = IDID (ID, IUSERID)  
IID = IDID (ID)

DESCRIPTION OF PARAMETERS

ID - WILL CONTAIN 4-CHARACTER USER INITIALS FROM  
CHARGE CARD OR START OF LOGIN  
IUSERID - WILL CONTAIN 4-CHARACTER USER INITIALS FROM  
CHARGE CARD OR UP TO 10-CHARACTER USER ID  
FROM LOGIN  
(IF ID = IUSERID, IT IS A BATCH JOB)

WHEN USED AS A FUNCTION, THE CONTENTS OF ID IS ALSO RETURNED  
AS THE FUNCTION VALUE.

CM REQUIRED: 27B

METHOD

THE ID IS TAKEN FROM THE CONTROL POINT AREA.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF

OTHERS

RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS

L41FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/28/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'IDIGIT'

PURPOSE

CHECK FOR DIGITS IN A FIELD WITHIN A WORD

FUNCTIONAL CATEGORIES: M5

USAGE

IDIGIT (I, ISTART, ISTOP)  
IDIGIT (I, ISTART)  
IDIGIT (I)

DESCRIPTION OF PARAMETERS

I - WORD TO BE ANALYZED  
ISTART - STARTING POSITION OF FIELD TO BE CHECKED  
(1-10, DEFAULT: 1)  
ISTOP - STOP POSITION OF FIELD TO BE CHECKED  
(1-10, DEFAULT: 10)  
(TESTING WILL STOP IF 00B ENCOUNTERED)

REMARKS

THE VALUE RETURNED IS ONE OF THE FOLLOWING:  
-11 - ERROR - ISTOP < ISTART  
-N - ERROR - START NON-DIGIT FOUND IN POSITION N  
0 - ALL POSITIONS IN FIELD ARE DIGITS  
+N - 00B FOUND IN POSITION N  
ALL PRECEDING CHARACTERS ARE DIGITS

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE  
LOCF  
MAXO  
MINO  
SHIFT  
OTHERS  
NONE

ARITHMETIC STATEMENT FUNCTIONS  
NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 76B

AUTHOR

DAVID V SOMMER - NSRDC CODE 1892.2

DATE WRITTEN: 05/13/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE  
UPDATE LIBRARY: NSRDCPL.ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'IFINDCH'  
FUNCTION 'IFINDCH'

PURPOSE

FIND FIRST OCCURRENCE OF SPECIFIED CHARACTER IN ARRAY

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV

USAGE

CALL IFINDCH (A, NA, CHAR, NC, NW)  
NC = IFINDCH (A, NA, CHAR, NC, NW)  
NC = IFINDCH (A, NA, CHAR)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE SEARCHED  
NA - NUMBER OF WORDS IN 'A' TO BE SEARCHED  
CHAR - CHARACTER TO BE SEARCHED FOR (1R FORMAT)  
NC - OUTPUT POSITION OF FIRST OCCURRENCE OF CHAR IN 'A'  
'IF NO MATCH, ZERO (0) IS RETURNED)  
NW - OUTPUT SUBSCRIPT OF WORD IN 'A' CONTAINING CHAR  
(IF NO MATCH, NW IS SET TO NA)

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF

OTHERS

GETCHA - GET CHARACTER FROM ARRAY

CM REQUIRED: 100B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/20/76

DATE(S) REVISED

11/02/76 - CHANGE TO FUNCTION AND SUBROUTINE

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'IFMTV'

PURPOSE

FAST I-FORMAT DECODE OF VARIABLE LENGTH INPUT (UNSIGNED,  
POSITIVE INTEGER)

FUNCTIONAL CATEGORIES: I4

USAGE

IFMTV (I)

DESCRIPTION OF PARAMETER

I - SINGLE WORD CONTAINING NUMBER TO BE DECODED;  
1-10 DIGITS, LEFT-JUSTIFIED, ZERO-PADDED;  
A NON-DIGIT EMBEDDED IN THE FIELD WILL RETURN -1  
(EG, 3L987 WILL RETURN THE INTEGER 987;  
6L9 7654 WILL RETURN -1 (EMBEDDED BLANK))

REMARKS

USEFUL IN DECODING INTEGERS PASSED AS ARGUMENTS IN THE  
EXECUTE STATEMENT FOR A FTN PROGRAM.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

LANGUAGE: FORTRAN IV EXTENDED

CM REQUIRED: 27B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/74

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'IHMS'

PURPOSE

CONVERT SECONDS TO ' HH.MM.SS.'

FUNCTIONAL CATEGORIES: M2

USAGE

IHMS (ISEC)

DESCRIPTION OF PARAMETER

ISEC - TIME (IN SECONDS) TO BE CONVERTED

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

OR SHIFT

OTHERS

NONE

CM REQUIRED: 44B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 05/08/74

DATE(S) REVISED

FUNCTION 'IPAKLFT'

PURPOSE

SQUEEZE LEFT AND REMOVE ZEROS (00B) AND BLANKS (55B), RETURN  
NUMBER OF CHARACTERS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

IF ANY BLANKS OR ZEROS WERE REMOVED, THE ARRAY IS PADDED  
WITH TRAILING ZEROS

USAGE

NCHAR = IPAKLFT (A)  
NCHAR = IPAKLFT (A, NA)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE PROCESSED  
NA - NUMBER OF WORDS TO BE PROCESSED  
(OMITTED = 1)  
IPAKLFT - NUMBER OF NON-BLANK (NON-ZERO) CHARACTERS AFTER  
PROCESSING

CM REQUIRED: 107B

EXAMPLE

DIMENSION A(3)  
DATA A/ "THIS IS A SAMPLE FIELD"/  
NCHAR = IPAKLFT (A, 3)

AFTER EXECUTION: 'A' = 18LTHISISASAMPLEFIELD, IPAKLFT = 18

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF

OTHERS

GETCHA - GET A CHARACTER

PUTCHA - PUT A CHARACTER

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/25/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'IROMAN'

PURPOSE

CONVERT ROMAN NUMBERS TO INTEGER

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

REMARKS

VALIDITY OF THE ROMAN NUMBER IS NOT CHECKED. INVALID ROMAN  
NUMERALS ARE IGNORED. ROMAN NUMBER ENDS WHEN FIRST  
BLANK OR DOB IS ENCOUNTERED.

USAGE

IVAR = IROMAN (NUMBER)

DESCRIPTION OF PARAMETERS

IROMAN - WILL CONTAIN INTEGER EQUIVALENT OF SUPPLIED  
ROMAN NUMBER

NUMBER - ROMAN NUMBER TO BE CONVERTED

CM REQUIRED: 131B

EXAMPLES

MCMLXXVI WILL RETURN THE INTEGER 1976  
I " " " " 1  
ETC.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

GETCHA - EXTRACT CHARACTER FROM AN ARRAY

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/02/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'ISEC'

PURPOSE

CONVERT HH.MM.SS TO SECONDS

FUNCTIONAL CATEGORIES: M2

USAGE

ISEC (ITIME)

DESCRIPTION OF PARAMETER

ITIME - TIME TO BE CONVERTED

(MAY BE 'HH.MM.SS.', ' HH.MM.SS.', OR ' HH.MM.SS')

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

FAST I-FORMAT DECODE

I21FMT I24FMT I27FMT

FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

L11FMT

CM REQUIRED: 40B

AUTHOR

DAVID V SOMMER - NSRDC CODE 1892.2

DATE WRITTEN: 05/01/74

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC



FUNCTION 'ISITCNF'

PURPOSE

SEE IF SPECIFIED FILE IS CONNECTED

FUNCTIONAL CATEGORIES: Q0

USAGE

ISITCNF (I)

DESCRIPTION OF PARAMETER

I - FILE TO BE CHECKED (EG, 5LTAPE1)

REMARKS

THE FILE BEING TESTED MUST BE OPENED BEFORE USING THIS FUNCTION. FOR FORTRAN LFN'S, THIS IS ACCOMPLISHED BY ANY I/O OPERATION OR CALL CONNEC OR CALL DISCON.

THE VALUE RETURNED WILL BE ONE OF:

- +1 - FILE IS CONNECTED
- 0 - FILE IS NOT CONNECTED
- 1 - ERROR - FILE NOT FOUND
- 2 - ERROR - I = 0

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

MFETCH - GET SPECIFIED WORD IN USER'S FIELD LENGTH

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

METHOD

BIT 44 OF WORD 10 (11TH WORD) OF FIT IS EXTRACTED.

CM REQUIRED: 54B

AUTHOR

DAVID V SOMMER - NSRDC CODE 1892.2

DATE WRITTEN: 05/02/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'ISTAPE'

PURPOSE

GENERATE TAPE NAME 'TAPENN'

FUNCTIONAL CATEGORIES: M4

USAGE

NAME = ISTAPE (NN)

DESCRIPTION OF PARAMETERS

NAME - RESULTANT DISPLAY CODE NAME 'TAPENN'  
(LEFT-JUSTIFIED, ZERO-FILLED)  
(5LTAPEN OR 6LTAPENN)

NN - FORTRAN LOGICAL UNIT NUMBER

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

LANGUAGE: CDC 6000 CP COMPASS

CM REQUIRED: 23B

AUTHOR

NWL

DATE WRITTEN: ?

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'ISUMIT'

PURPOSE

SUM ELEMENTS OF INTEGER ARRAY

FUNCTIONAL CATEGORIES: A1

LANGUAGE: FORTRAN IV

REMARKS

NONE

USAGE

ITOTAL = ISUMIT (IARRAY, N)

DESCRIPTION OF PARAMETERS

ISUMIT - WILL CONTAIN IARRAY(1)+IARRAY(2)+...+IARRAY(N)

IARRAY - ARRAY TO BE SUMMED

N - NUMBER OF ELEMENTS OF IARRAY TO BE SUMMED

CM REQUIRED: 16B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/23/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'JGDATE'

PURPOSE

CONVERT ANY GREGORIAN DATE TO A RELATIVE JULIAN DATE OR VICE  
VERSA (FOR MULTI-YEAR COMPUTATIONS)

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS

BURROUGHS B7700  
CDC 6000

REMARKS

JG=1 IS VALID FOR ANY GREGORIAN DATE PRODUCING A RELATIVE  
JULIAN DATE GREATER THAN ZERO.

THIS SUBROUTINE IS USEFUL IN DETERMINING THE ELAPSED NUMBER  
OF DAYS BETWEEN ANY TWO CALENDAR DATES. IT CAN ALSO BE USED  
TO FIND THE CALENDAR DATE SO MANY DAYS FROM ANY GIVEN DATE.

THE RELATIVE JULIAN DATE CORRESPONDING TO A GREGORIAN DATE  
HAS MEANING TO THIS SUBROUTINE ONLY. IT REPRESENTS THE  
NUMBER OF DAYS SINCE 11/24/-4713 (EXTRAPOLATING THE  
GREGORIAN CALENDAR).

SEE ALSO SUBROUTINE 'JULIAN' FOR DAY-OF-YEAR DETERMINATION.

USAGE

CALL JGDATE (JG, JD, IGY, IGM, IGD)

DESCRIPTION OF PARAMETERS

JG - DIRECTION OF CONVERSION  
1 - GREGORIAN TO RELATIVE JULIAN  
2 - RELATIVE JULIAN TO GREGORIAN  
JD - RELATIVE JULIAN DATE (OUT IF JG=1, IN IF JG=2)  
IGY - GREGORIAN YEAR (EG, 1975) (IN IF JG=1, OUT IF JG=2)  
IGM - GREGORIAN MONTH (1-12) (IN IF JG=1, OUT IF JG=2)  
IGD - GREGORIAN DAY (1-31) (IN IF JG=1, OUT IF JG=2)

CM REQUIRED: B7700: CORE: EST 96 WORDS; STACK: EST 3 WORDS  
CDC : 71B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
NONE  
OTHERS  
NONE

ARITHMETIC STATEMENT FUNCTIONS  
NONE

METHOD  
SEE COMM. OF THE ACM, VOL. 11, NO. 10, OCT 1968, PAGE 657.

AUTHOR  
?

DATE WRITTEN: 1968 OR EARLIER

DATE(S) REVISED  
03/01/79 - IMPLEMENT ON B7700

LOCATION OF DECKS

SOURCE

B7700: \*SOURCE/NSRDC/JGDATE

CDC : UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

B7700: \*NSRDC/JGDATE

CDC : EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'JOBNAME'  
FUNCTION 'JOBNAME'

PURPOSE  
GET SYSTEM JOB NAME FOR THIS JOB

FUNCTIONAL CATEGORIES: Q0

USAGE  
CALL JOBNAME (I)  
VARIABLE = JOBNAME (I)

DESCRIPTION OF PARAMETERS  
JOBNAME - WILL CONTAIN JOB NAME, LEFT-JUSTIFIED,  
ZERO-FILLED (WHEN USED AS FUNCTION)  
I - WILL CONTAIN JOB NAME, LEFT-JUSTIFIED,  
ZERO-FILLED

REMARKS  
NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
NONE  
OTHERS  
RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS  
NONE

LANGUAGE: FORTRAN IV

METHOD  
THE JOB NAME IS TAKEN FROM THE FIRST 7 CHARACTERS OF  
CONTROL POINT AREA + 25B

CM REQUIRED: 25B

AUTHOR  
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/04/75

DATE(S) REVISED

LOCATION OF DECKS  
SOURCE  
UPDATE LIBRARY: NSRDCPL,ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

FUNCTION 'JOBORG'  
SUBROUTINE 'JOBORG'

PURPOSE  
DETERMINE JOB ORIGIN

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

REMARKS  
NONE

USAGE  
IVAR = JOBORG (I, IA)  
IVAR = JOBORG (I)  
CALL JOBORG (I, IA)  
CALL JOBORG (I)

DESCRIPTION OF PARAMETERS  
I - WILL CONTAIN ONE OF THE FOLLOWING:  
1 - IF CALLING JOB IS A BATCH JOB  
2 - FOR REAL TIME JOB  
3 - FOR GRAPHICS JOB  
4 - FOR MULTI-USER JOB  
5 - FOR INTERCOM  
IA - IF SPECIFIED, WILL CONTAIN: 'BATCH', 'REAL TIME',  
'GRAPHICS', 'MULTI-USER', OR 'INTERCOM', ACCORDING  
TO THE VALUE OF 'I'.

IF USED AS A FUNCTION, 'JOBORG' WILL RETURN THE SAME VALUE  
AS 'I'.

CM REQUIRED: 35B

METHOD  
THE INFORMATION IS TAKEN FROM THE CONTROL POINT AREA.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
AND  
OTHERS  
RCPA - READ CONTROL POINT AREA

AUTHOR  
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/07/77

DATE(S) REVISED

LOCATION OF DECKS  
SOURCE  
UPDATE LIBRARY: NSRDCPL.ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'JULIAN'

PURPOSE

CONVERT ANY GREGORIAN DATE TO A JULIAN DAY-OF-YEAR OR VICE  
VERSA (FOR SINGLE YEAR COMPUTATIONS ONLY)

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS

BURROUGHS B7700  
CDC 6000

REMARKS

THE PARAMETER 'IGY' IS ALWAYS INPUT.

IF JG=1 AND (GM<1 OR GM>12 OR GD<1 OR GD>31),  
THEN JD IS SET TO ZERO (0).

IF JG=2 AND (JD<1 OR JD>366), THEN GM IS SET TO ZERO (0).

IF JG IS NOT 1 OR 2, THEN JD AND GM ARE SET TO ZERO (0).

SEE ALSO SUBROUTINE 'JGDATE' FOR MULTI-YEAR COMPUTATIONS.

USAGE

CALL JULIAN (JG, JD, IGY, IGM, IGD)

DESCRIPTION OF PARAMETERS

JG - DIRECTION OF CONVERSION

1 - GREGORIAN TO JULIAN

2 - JULIAN TO GREGORIAN

JD - JULIAN DAY-OF-YEAR (1-366)

IGY - GREGORIAN YEAR (E.G., 1968, ALWAYS INPUT)

IGM - GREGORIAN MONTH (1-12)

IGD - GREGORIAN DAY (1-31)

CM REQUIRED: B7700: CORE: EST 144 WORDS; STACK: EST 5 WORDS  
CDC : 137B



SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
MOD  
OTHERS  
NONE

AUTHOR  
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 1968

DATE(S) REVISED  
04/26/73 - REWRITTEN IN FORTRAN FOR CDC 6000 - DVS  
06/21/76  
01/11/78  
03/01/79 - IMPLEMENTED ON B7700

LOCATION OF DECKS

SOURCE

B7700: \*SOURCE/NSRDC/JULIAN  
CDC : UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

B7700: \*NSRDC/JULIAN  
CDC : EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'KUTMER'

## PURPOSE

INTEGRATE A SYSTEM OF FIRST-ORDER ORDINARY DIFFERENTIAL EQUATIONS USING THE KUTTA-MERSON FOURTH-ORDER, SINGLE-STEP METHOD

FUNCTIONAL CATEGORIES: D2

## USAGE

CALL KUTMER (N, T, Y, EPS, H, FIRST, HCX, A)

## DESCRIPTION OF PARAMETERS

- N - NUMBER OF EQUATIONS (I.E., THE NUMBER OF COMPONENTS IN Y-BAR)
- T - THE INDEPENDENT VARIABLE, T
- Y - THE ARRAY OF DEPENDENT VARIABLES, Y-BAR
- EPS - THE RELATIVE ERROR CRITERION FOR EACH STEP, TO BE USED FOR THOSE COMPONENTS OF Y-BAR WHICH ARE GREATER THAN A IN ABSOLUTE VALUE
- H - THE INTEGRATION INTERVAL, H
- FIRST - WILL HAVE ONE OF THE FOLLOWING SETTINGS:
  - 0 - WHEN KUTMER IS ENTERED FOR THE FIRST TIME, OR IS RE-ENTERED WITH A CHANGED INTERVAL <H>. WHEN KUTMER IS SO ENTERED, <FIRST> IS RESET BY KUTMER TO 1.
  - 1 - WHEN KUTMER IS RE-ENTERED WITH THE SAME INTERVAL <H>, TO CONTINUE AN INTEGRATION SEQUENCE. UNDER THESE CIRCUMSTANCES, KUTMER WILL NOT RESET <FIRST>.
  - 2 - WHEN KUTMER CANNOT MEET THE SPECIFIED ERROR CRITERIA EVEN WHEN THE INTEGRATION STEP HAS BEEN REDUCED TO H/128. KUTMER WILL RESET <FIRST> TO 2 AND PRINT A STATEMENT INDICATING THAT THE ERROR CRITERION COULD NOT BE MET. THEN KUTMER WILL RETURN CONTROL TO THE CALLING PROGRAM.
- HCX - IS SET UP BY KUTMER BEFORE EACH RETURN TO THE CALLING PROGRAM. THIS WILL CONTAIN THE MINIMUM STEP SIZE USED DURING THE INTEGRATION OVER THE INTERVAL <H>.
- A - AN ABSOLUTE ERROR CRITERION TO BE USED FOR ANY COMPONENT OF Y-BAR WHENEVER IT BECOMES SMALLER IN ABSOLUTE VALUE THAN <A>.

ON ENTRY, <T> AND THE ARRAY <Y> CONTAIN VALUES OF THE INDEPENDENT AND THE DEPENDENT VARIABLES, RESPECTIVELY, AT THE BEGINNING OF THE INTERVAL OF INTEGRATION. ON RETURN, PROVIDED THE ERROR CRITERION HAS BEEN MET, I.E., <FIRST> HAS NOT BEEN RESET TO 2, <T> AND <Y> CONTAIN VALUES OF T AND Y-BAR AT THE END VALUES OF THE INTEGRATION INTERVAL OF <H>.

A SUBROUTINE FOR EVALUATING F-BAR(T, Y-BAR) WITH A CALL OF THE FORM

CALL DAUX (T, Y, F)

MUST BE SUPPLIED. HERE <T> AND THE ARRAY <Y> REFER TO T AND Y-BAR, RESPECTIVELY, AND THE ARRAY <F> SHOULD CONTAIN, ON RETURN FROM THIS SUBROUTINE, THE VECTOR F-BAR (T, Y-BAR).

# REMARKS

THIS ROUTINE WILL INTEGRATE A SYSTEM OF FIRST-ORDER  
DIFFERENTIAL EQUATIONS OF THE FORM

$$\frac{d\bar{Y}}{dt} = \bar{F}(T, \bar{Y})$$

GIVEN A SET OF INITIAL CONDITIONS  $T_0, \bar{Y}(T_0)$ ,  
AN INTERVAL H AND A SUBROUTINE FOR EVALUATING  $\bar{F}(T, \bar{Y})$   
FOR SPECIFIED VALUES OF T AND Y-BAR.

THE DIMENSIONS OF THE ARRAYS FOR STORING INTERMEDIATE VALUES  
OF THE VECTORS F-BAR AND Y-BAR ARE PRESENTLY SET TO 10.  
THIS CAN BE READILY CHANGED BY CHANGING THE DIMENSION  
STATEMENT AT THE BEGINNING OF THE SUBROUTINE.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

ABS

OTHERS

DAUX - USER-SUPPLIED SUBROUTINE TO EVALUATE F-BAR

LANGUAGE: FORTRAN IV

## METHOD

THE KUTTA-MERSON METHOD OF INTEGRATING A SYSTEM OF FIRST-  
ORDER ORDINARY DIFFERENTIAL EQUATIONS IS USED. THIS IS A  
FOURTH-ORDER, SINGLE-STEP METHOD WHICH PROVIDES A  
CONVENIENT TECHNIQUE FOR AUTOMATIC INTERVAL ADJUSTMENT  
(C.F., E. FOX, "NUMERICAL SOLUTION OF ORDINARY AND PARTIAL  
DIFFERENTIAL EQUATIONS", ADDISON-WESLEY, READING, MASS.,  
1962, P. 24). THE ROUTINE IS BASICALLY A TRANSLATION INTO  
FORTRAN OF ALGOL ALGORITHM 218 PUBLISHED IN "COMMUNICATIONS  
OF THE ACM", DEC. 1963.

## OUTPUT UNITS

UNIT #	LFN	USE
	OUTPUT	ERROR MESSAGE

CM REQUIRED: 335B

## AUTHOR

E. CUTHILL - DTNSRDC CODE 1805

DATE WRITTEN: 10/29/64 (FORTRAN VERSION)

DATE(S) REVISED

## LOCATION OF DECKS

SOURCE

TAPE LABELLED: CLIBRARYUPD3,D=HY

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'LASTC'

PURPOSE

DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK  
(NON-ZERO (00B))

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

THE WORD IN 'A' WHICH CONTAINING THE LAST NON-BLANK (NON-  
ZERO) CHARACTER IS (LASTC(A,N)+9)/10

USAGE

LASTC (A)  
LASTC (A, N)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE SCANNED  
N - NUMBER OF WORDS IN 'A' TO BE PROCESSED  
LASTC - WILL CONTAIN THE NUMBER OF CHARACTERS IN 'A'  
EXCLUDING TRAILING BLANKS (ZEROS)

CM REQUIRED: 64B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE  
LOCF SHIFT  
OTHERS  
NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/06/76

DATE(S) REVISED

07/25/77 - MAKE PARAMETER 'N' OPTIONAL

LOCATION OF DECKS

SOURCE  
UPDATE LIBRARY: NSRDCPL,ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

FUNCTION 'LASTCH'

PURPOSE

DETERMINE NUMBER OF CHARACTERS THRU LAST NON-BLANK

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

THE WORD IN 'A' WHICH CONTAINS THE LAST NON-BLANK CHARACTER  
IS (LASTCH(A,N)+9)/10 (CDC) OR (LASTCH(A,N)+5)/6 (B7700).

USAGE

LASTCH (A, NCHAR)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE SCANNED  
NCHAR - NUMBER OF CHARACTERS IN 'A' TO BE PROCESSED  
LASTCH - WILL CONTAIN THE NUMBER OF CHARACTERS IN 'A'  
EXCLUDING TRAILING BLANKS

CM REQUIRED: 71B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE  
AND MOD  
OTHERS  
NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 02/13/79

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

CDC : UPDATE LIBRARY: NSRDCPL,ID=CSYS  
B7700: PF: (CSYS) SOURCE/NSRDC/LASTCH

OBJECT

CDC : EDITLIB USER LIBRARY: NSRDC  
B7700: \*NSRDC/LASTCH

FUNCTION 'LASTWRD'

PURPOSE

DETERMINE SUBSCRIPT OF LAST WORD OF ARRAY WHICH  
CONTAINS A NON-BLANK

FUNCTIONAL CATEGORIES: M5

USAGE

LASTWRD (A, N)

DESCRIPTION OF PARAMETERS

LASTWRD - WILL CONTAIN SUBSCRIPT OF LAST WORD OF ARRAY WHICH  
CONTAINS A NON-BLANK (AND NON-00B)

A - ARRAY TO BE SCANNED  
N - NUMBER OF WORDS IN 'A' TO BE PROCESSED

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

LASTC - FIND LAST NON-BLANK/NON-00B CHARACTER IN ARRAY

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 22B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATA WRITTEN: 03/15/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'LBYT'

PURPOSE

EXTRACT VARIABLE LENGTH BYTE

FUNCTIONAL CATEGORIES: M4

USAGE

VARIABLE = LBYT (N, LENGTH, FROM)

DESCRIPTION OF PARAMETERS

VARIABLE - LOCATION INTO WHICH THE EXTRACTED BYTE IS  
STORED RIGHT-JUSTIFIED

N - STARTING BIT POSITION OF THE BYTE TO BE  
EXTRACTED. BITS ARE NUMBERED 1-60 FROM RIGHT  
TO LEFT.

LENGTH - LENGTH OF THE BYTE (NUMBER OF BITS)

FROM - WORD FROM WHICH THE BYTE IS TO BE EXTRACTED

REMARKS

EXTRACTS A BYTE OF ANY LENGTH (1-60 BITS) FROM A 60-BIT  
WORD. THE EXTRACTED BYTE IS THEN STORED RIGHT-JUSTIFIED  
INTO ANOTHER 60-BIT WORD.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

NONE

EXAMPLE

STARTING AT THE TWELFTH BIT FROM THE RIGHT OF A WORD, A  
FOUR-BIT BYTE WILL BE EXTRACTED FROM THE VARIABLE <TAKE> AND  
STORED IN VARIABLE <ISTORE> IN BIT PLACES 1-4.

TAKE = 1111 2222 3333 4476 5555B

ISTORE = LBYT (12, 4, TAKE)

RESULTS IN

ISTORE = 0000 0000 0000 0000 0016B

NOTE: BIT POSITIONS 12-15 OF <TAKE> ARE 1 1 1 0.

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 16B

AUTHOR

FROM CDC KRONOS SYSTEM

DATE WRITTEN:

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'LEFTADJ'

## PURPOSE

SQUEEZE LEFT AND REMOVE BLANKS AND OOB (USER MAY SUPPLY TRAILING FILL CHARACTER)

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

## REMARKS

THE LAST NON-BLANK CHARACTER POSITION AND WORD ARE RETURNED.

## USAGE

CALL LEFTADJ (A, NA, LASTC, NW, FILL)  
CALL LEFTADJ (A, NA, LASTC, NW)

## DESCRIPTION OF PARAMETERS

- A - ARRAY TO BE LEFT JUSTIFIED
- NA - NUMBER OF WORDS IN 'A' TO BE PROCESSED
- LASTC - WILL RETURN THE LAST CHARACTER POSITION WHICH IS NON-BLANK/NON-OOB (LEFT-MOST CHARACTER POSITION IS 1)  
(IF ARRAY CONTAINS ONLY BLANKS AND/OR OOB, LASTC IS SET TO 0)
- NW - WILL RETURN SUBSCRIPT OF WORD CONTAINING LAST NON-BLANK/NON-OOB CHARACTER  
(IF LASTC=0, THEN NW IS SET TO 0)
- FILL - OPTIONAL FILL CHARACTER FOR EACH CHARACTER POSITION AFTER LASTC (USE 1R OR 1H FORMAT)  
(IF OMITTED, FILL CHARACTER IS OOB)

CM REQUIRED: 117B

## EXAMPLE

```
DIMENSION A(4)
CONTENTS OF A: 12345      67890      ABCDEFGHIJ
CALL LEFTADJ (A, 4, LASTC, NW)
CONTENTS OF A: 1234567890ABCDEFGHIJ
LASTC IS 20; NW = 2
CALL LEFTADJ (A, 4, LASTC, NW, 1R/)
CONTENTS OF A: 1234567890ABCDEFGHIJ////////////////////
LASTC AND NW ARE THE SAME
```



SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

LOCF

OTHERS

GETCHA - EXTRACT ONE CHARACTER FROM AN ARRAY

PUTCHA - INSERT ONE CHARACTER INTO AN ARRAY

ARITHMETIC STATEMENT FUNCTIONS

R11FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/02/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'LINE6'

PURPOSE

SET PRINT FILE TO 6 LINES PER INCH

FUNCTIONAL CATEGORIES: J4

USAGE

CALL LINE6 (IOUT)

DESCRIPTION OF PARAMETER

IOUT - OUTPUT UNIT NUMBER (1-99) OR NAME (1-7 CHARACTERS,  
LEFT-JUSTIFIED, ZERO-FILLED)

REMARKS

USER SHOULD PRINT HIS NEXT LINE AT THE TOP OF THE NEXT PAGE.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

OUTPUT UNIT

UNIT #	LFN	USE
--------	-----	-----

IOUT		LISTABLE OUTPUT FILE
------	--	----------------------

CM REQUIRED: 20B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 06/11/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'LINE8'

PURPOSE

SET PRINT FILE TO 8 LINES PER INCH

FUNCTIONAL CATEGORIES: J4

USAGE

CALL LINE8 (IOUT)

DESCRIPTION OF PARAMETER

IOUT - OUTPUT UNIT NUMBER (1-99) OR NAME (1-7 CHARACTERS,  
LEFT-JUSTIFIED, ZERO-FILLED)

REMARKS

USER SHOULD PRINT HIS NEXT LINE AT THE TOP OF THE NEXT PAGE.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

OUTPUT UNIT

UNIT #	LFN	USE
--------	-----	-----

IOUT		LISTABLE OUTPUT FILE
------	--	----------------------

CM REQUIRED: 20B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 06/11/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'MACHINE'

PURPOSE

RETURN 4-WORD SYSTEM HEADING

USAGE

CALL MACHINE (ARRAY)

DESCRIPTION OF PARAMETER

ARRAY - 4-ELEMENT ARRAY WHICH WILL CONTAIN THE SYSTEM

FUNCTIONAL CATEGORIES: Q0

HEADING

(E.G., ' NSRDC 6600 NOS/BE 1.2 I+1980330 ')

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

LANGUAGE: COMPASS

CM REQUIRED: 25B

AUTHOR

NSRDC CODE 1892.3

DATE WRITTEN: 04/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

CODE 1892.3

OBJECT

EDITLIB SYSTEM LIBRARY: NSRDC

FUNCTION 'MASKIT'

PURPOSE

DYNAMIC MASK GENERATOR

FUNCTIONAL CATEGORIES: M0

USAGE

MSK = MASKIT (FL1, BIT1, FL2, BIT2, ..., FLN, BITN)

DESCRIPTION OF PARAMETERS

FL - NUMBER OF BITS

BIT - STARTING BIT ADDRESS

BIT ADDRESSES ARE THE RELEVANT POWER OF 2.  
I.E., 59.58,57,... ...,2,1,0

REMARKS

MASKIT GENERATES AS ITS FUNCTIONAL VALUE A WORD WITH 'N'  
FIELDS OF BITS SET, EACH FIELD 'FL' BITS LONG, AND STARTING  
AT BIT ADDRESS 'BIT'.

EXAMPLE: TO GENERATE THE MASK

11100011111111110111000000000100010000000111111000000111111  
7 0 7 7 7 6 7 0 0 0 4 2 0 0 7 7 0 0 7 7

USE THE FOLLOWING:

MSK = MASKIT (3,59, 11,53, 3,41, 1,29, 1,25, 6,17, 6,5)

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 16B

AUTHOR

C FLINK - KPS NWL

DATE WRITTEN: 07/70

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'MATINS'

## PURPOSE

MATRIX INVERSION WITH ACCOMPANYING SOLUTION OF SIMULTANEOUS EQUATIONS AND DETERMINANT

FUNCTIONAL CATEGORIES: F4 F1 F3

LANGUAGE: FORTRAN IV

## COMPUTERS

CDC 6000  
BURROUGHS B7700

## REMARKS

TESTS FOR LOSS OF DIGITS DUE TO SUBTRACTION.

TO SCALE THE DETERMINANT, ROUTINE MUST BE RECOMPILED TO OMIT INTERNAL 'DETERM = 1.'. IN THIS CASE, PARAMETER 'DETERM' IS THE INPUT SCALING FACTOR AS WELL AS THE OUTPUT DETERMINANT.

## USAGE

CALL MATINS (A, NR, N1, B, NC, M1, DETERM, ID, INDEX)

## DESCRIPTION OF PARAMETERS

A - INPUT MATRIX (NR X NR)  
(WILL BE REPLACED BY INVERSE OF 'A')  
NR - REFERS TO CALLING PROGRAM DIMENSIONS:  
# ROWS IN 'A'; # COLUMNS IN 'A';  
# ROWS IN 'B'; # ROWS IN 'INDEX'  
N1 - ORDER OF 'A'  
(ACTUAL SIZE OF 'A' BEING USED)  
B - COLUMN VECTORS  
(WILL BE REPLACED BY CORRESPONDING SOLUTION VECTORS)  
NC - REFERS TO CALLING PROGRAM DIMENSIONS:  
# COLUMNS IN 'B'  
M1 - NUMBER OF ACTUAL COLUMN VECTORS IN 'B'  
(MAY BE 0)  
DETERM - OUTPUT DETERMINANT  
ID - OUTPUT CODE  
1 - INVERSE SUCCESSFUL  
2 - MATRIX 'A' SINGULAR  
INDEX - WORKING STORAGE ARRAY OF DIMENSION (NR X 3)

NOTE: N1 <= NR; M1 <= NC

CM REQUIRED: CDC 6000: 356B  
B7700 : EST 286 WORDS

## METHOD

PIVOT METHOD - GAUSS-JORDAN

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
ABS  
OTHERS  
NONE

AUTHORS  
ANF402 FROM SHARE  
SHARON E GOOD - DTNSRDC CODE 1892.1  
C R NEWMAN - NOL

DATE WRITTEN: 11/71

DATE(S) REVISED  
07/26/77 - ADD CRN CODING (SEG)

LOCATION OF DECKS  
SOURCE  
CDC 6000: TAPE LABELLED: CLIBRARYUPD3  
B7700 : \*SOURCE/NSRDC/MATINS  
OBJECT  
CDC 6000: EDITLIB USER LIBRARY: NSRDC  
B7700 : \*NSRDC/MATINS

SUBROUTINE 'MAXE'  
FUNCTION 'MAXE'  
FUNCTION 'AMAXE'

PURPOSE  
FIND MAXIMUM VALUE OF AN ARRAY

FUNCTIONAL CATEGORIES: M5

USAGE  
CALL MAXE (ARRAY, ISIZE, AMAXV)

MAXV = MAXE (IARRAY, ISIZE)  
AMAXV = AMAXE ( ARRAY, ISIZE)

DESCRIPTION OF PARAMETERS  
ARRAY - REAL ARRAY TO BE PROCESSED  
IARRAY - INTEGER ARRAY TO BE PROCESSED  
ISIZE - LENGTH OF ARRAY/IARRAY  
AMAXV - REAL MAXIMUM RETURNED IN SUBROUTINE

REMARKS  
FUNCTION MAXE HAS INTEGER INPUT AND OUTPUT.  
FUNCTION AMAXE HAS REAL INPUT AND OUTPUT.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
NONE  
OTHERS  
NONE

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 14B

AUTHOR  
C FLINK - KPS NWL

DATE WRITTEN: 11/22/70

DATE(S) REVISED

LOCATION OF DECKS  
SOURCE  
UPDATE LIBRARY: NSRDCPL.ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC



SUBROUTINE 'MEMUSED'

PURPOSE

PRINT MESSAGE IN DAYFILE GIVING FIELD LENGTH IN USE AT  
TIME OF CALL TO THIS ROUTINE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: CDC 6000 CP COMPASS

REMARKS

THIS ROUTINE ISSUES A MEMORY MACRO REQUEST TO DETERMINE  
FIELD LENGTH AND PRINTS A MESSAGE IN THE DAYFILE OF  
THE FORM:

FIELD LENGTH IN USE (OCTAL) = XXXXXX

IT MIGHT BE OF INTEREST TO USERS WITH PROGRAMS WHICH  
MANAGE FIELD LENGTH DYNAMICALLY ABOVE THAT SHOWN IN THE  
NORMAL LOAD MAP (SUCH AS FILE BUFFER SPACE IN COBOL  
PROGRAMS).

USAGE

CALLED FROM COBOL PROGRAM  
ENTER MEMUSED.

CALLED FROM FTN PROGRAM  
CALL MEMUSED

CM REQUIRED: 30B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHOR

BRUCE D. BLACK - DTNSRDC CODE 1892.1 (CDC)

DATE WRITTEN: 04/07/78

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'MFETCH'

PURPOSE

FETCH A SINGLE WORD (BY ABSOLUTE ADDRESS) FROM USER'S FL

FUNCTIONAL CATEGORIES: K2

USAGE

MFETCH (ADDR)

DESCRIPTION OF PARAMETER

ADDR - ADDRESS IN USER'S FL TO BE FETCHED

REMARKS

'MFETCH' IS AN ENTRY POINT IN 'CMDRCT'.

NO ERROR CHECKING IS DONE.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

NONE

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 11B (INCLUDES 'MSET')

AUTHOR

? - NWL

DATE WRITTEN:

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USSER LIBRARY: NSRDC

SUBROUTINE 'MFRAME'

PURPOSE

OBTAIN THE MACHINE AND MAINFRAME RUNNING THE PROGRAM

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS

BURROUGHS B7700  
CDC 6000

REMARKS

NONE

USAGE

CALL MFRAME (CPU, MF)

DESCRIPTION OF PARAMETER

CPU - WILL RETURN MACHINE ON WHICH THE PROGRAM IS RUNNING  
(LEFT-ADJ, BLANK-FILLED)  
(WILL RETURN ONE OF:

"6700", "6600", "6400", "CY74", "B7700")

MF - WILL RETURN MAINFRAME ON WHICH THE PROGRAM IS RUNNING  
(LEFT-ADJ, BLANK-FILLED)  
(WILL RETURN ONE OF:

"MFA", "MFB", "MFC", "MFD", "MFZ")

CM REQUIRED: CDC : 76B

B7700: EST 41 WORDS

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND OR SHIFT

OTHERS

MACHINE - GET SYSTEM MACHINE INFORMATION

ARITHMETIC STATEMENT FUNCTIONS

A38FMT0 - FAST A-FORMAT DECODE (LEFT-ADJ, BLANK-FILLED)  
(INSERT 0 AFTER 3RD CHARACTER)

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/15/79

DATE(S) REVISED

08/15/80 - ADD "CY74" FOR CYBER 74

LOCATION OF DECKS

SOURCE

CDC : UPDATE LIBRARY: NSRDCPL.ID=CSYS

B7700: \*SOURCE/NSRDC/MFRAME

OBJECT

CDC : EDITLIB USER LIBRARY: NSRDC

B7700: \*NSRDC/MFRAME

SUBROUTINE 'MINE'  
FUNCTION 'MINE'  
FUNCTION 'AMINE'

PURPOSE

FIND MINIMUM VALUE OF AN ARRAY

FUNCTIONAL CATEGORIES: M5

USAGE

CALL MINE (ARRAY, ISIZE, AMINV)

MINV = MINE (IARRAY, ISIZE)

AMINV = AMINE ( ARRAY, ISIZE)

DESCRIPTION OF PARAMETERS

ARRAY - REAL ARRAY TO BE PROCESSED

IARRAY - INTEGER ARRAY TO BE PROCESSED

ISIZE - LENGTH OF ARRAY/IARRAY

AMINV - REAL MINIMUM RETURNED IN SUBROUTINE

REMARKS

FUNCTION MINE HAS INTEGER INPUT AND OUTPUT.

FUNCTION AMINE HAS REAL INPUT AND OUTPUT.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 14B

AUTHOR

C FLINK - KPS NWL

DATE WRITTEN: 11/22/70

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'MONTH'

PURPOSE

FROM A DATE (MM/DD/YY) FIND THE MONTH AND RETURN FULL  
SPELLING AND 3- OR 4-CHARACTER ABBREVIATION

FUNCTIONAL CATEGORIES: M2

USAGE

CALL MONTH (DATE, MONTH, MM)

DESCRIPTION OF PARAMETERS

DATE - DATE TO BE PROCESSED ('MM/DD/YY ', ' MM/DD/YY '  
OR ' MM/DD/YY')

IMONTH - WILL CONTAIN THE MONTH (COMPLETE SPELLING)

MM - WILL CONTAIN THE MONTH (3- OR 4-CHARACTER  
ABBREVIATION)

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

I21FMT - FAST I-FORMAT DECODE

L11FMT - FAST L-FORMAT DECODE (LEFT-ADJ. ZERO-FILLED)

LANGUAGE: FORTRAN IV

CM REQUIRED: 63B

AUTHOR

DAVID V SMOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/21/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'MOVCHAR'

PURPOSE

MOVE ONE CHARACTER FROM ONE STRING TO ANOTHER

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

CALL MOVCHAR (FROM, FROM COL, TO, TO COL)

DESCRIPTION OF PARAMETERS

FROM - ARRAY CONTAINING STRING FROM WHICH THE CHARACTER  
IS TO BE EXTRACTED  
FROM COL - POSITION OF CHARACTER IN FROM  
(1 IS LEFTMOST POSITION)  
TO - ARRAY TO WHICH THE CHARACTER IS TO BE MOVED  
TO COL - POSITION OF CHARACTER IN TO  
(1 IS LEFTMOST POSITION)

CM REQUIRED: 35B

EXAMPLE

BEFORE: FROM=THIS IS A CHARACTER STRING.  
TO =THIS IS ANOTHER STRING  
CALL MOVSTR (FROM, 27, TO, 23)  
AFTER : TO =THIS IS ANOTHER STRING.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND MOD OR SHIFT  
OTHERS  
NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/14/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'MOVECM'

PURPOSE

MOVE WORDS FROM ONE AREA IN CORE TO ANOTHER

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC 6000 CP COMPASS

REMARKS

'MOVECM' IS ABOUT 20 PERCENT FASTER THAN THE FTN-SUPPLIED  
'MOVLEV'. IT MOVES 4 WORDS AT A TIME (INSTEAD OF 2) AND  
DOES NOT REQUIRE AT LEAST ONE CM WORD BETWEEN THE SENDING  
AND RECEIVING FIELDS.

AT SPEED, 'MOVECM' MOVES ABOUT 2 WORDS PER MICROSECOND.

USAGE

CALL MOVECM (FWA, LWA, NEW FWA)

DESCRIPTION OF PARAMETERS

FWA - FIRST WORD ADDRESS OF SENDING FIELD  
LWA - LAST WORD ADDRESS OF SENDING FIELD  
NEW FWA - FIRST WORD ADDRESS OF RECEIVING FIELD

(MOVE MEMORY WORDS BEGINNING AT FWA AND ENDING AT LWA  
TO A BLOCK STARTING AT NEW FWA.)

CM REQUIRED: 20B

EXAMPLE

MOVE ARRAY 'A' TO ARRAY 'B':  
...  
DIMENSION A(100), B(100)  
...  
CALL MOVECM (A(1), A(100), B(1))  
...

METHOD

WORDS ARE MOVED 4 AT A TIME, UNLESS FEWER THAN 4 REMAIN TO  
BE MOVED.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

NONE

AUTHOR

EXTRACTED FROM 'NETED', THE TEXT EDITOR FROM ED FOURT OF  
LAWRENCE BERKLEY LABS

DATE WRITTEN:

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'MOVEIT'

## PURPOSE

MOVLEV REPLACEMENT WHICH CALLS MOVECM

FUNCTIONAL CATEGORIES: K2

LANGUAGE: FORTRAN IV EXTENDED

## COMPUTERS

CDC 6000

## REMARKS

AT NOS/BE LEVEL 461, THE FTN SUBROUTINE 'MOVLEV' USES CMM, WHICH CAN CAUSE PROBLEMS WITH PROGRAMS MOVING INTO PROGRAM-EXTENDED FL. SUBROUTINE 'MOVECM' IS A MUCH FASTER ROUTINE WHICH DOES NOT USE CMM, HOWEVER, IT HAS A DIFFERENT CALLING SEQUENCE. 'MOVEIT' IS A TRANSITIONAL SUBROUTINE. IT HAS THE SAME CALLING SEQUENCE AS 'MOVLEV' BUT CALLS 'MOVECM'. IT TAKES A LITTLE LONGER TO EXECUTE THE MOVE BECAUSE IT INVOLVES TWO (2) CALLS, BUT THE CALLING SEQUENCE MAY BE MORE MEANINGFUL AND EASIER TO USE.

## USAGE

CALL MOVEIT (FROM, TO, NWORDS)

## DESCRIPTION OF PARAMETERS

FROM - ARRAY TO BE MOVED  
TO - RECEIVING ARRAY  
NWORDS - NUMBER OF WORDS TO BE MOVED

CM REQUIRED: 20B

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED PART OF LANGUAGE

NONE

## OTHERS

MOVECM - MOVE AN ARRAY 4 WORDS AT A TIME

## AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/16/79

## DATE(S) REVISED

07/15/80 - MOVE TO NSRDC

## LOCATION OF DECKS

### SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

### OBJECT

EDITLIB USER LIBRARY: NSRDC



SUBROUTINE 'MOVSTR'

PURPOSE

MOVE A STRING OF CHARACTERS FROM ONE ARRAY TO ANOTHER

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

CALL MOVSTR (FROM, IFROM, TO, ITO, LEN, IRC)  
CALL MOVSTR (FROM, IFROM, TO, ITO, LEN)

DESCRIPTION OF PARAMETERS

FROM - ARRAY FROM WHICH STRING IS TO BE EXTRACTED  
IFROM - STARTING POSITION OF STRING TO BE EXTRACTED  
(POSITION 1 IS LEFT-MOST CHARACTER OF FROM(1))  
TO - ARRAY TO RECEIVE THE STRING  
ITO - STARTING POSITION TO INSERT THE STRING  
(POSITION 1 IS LEFT-MOST CHARACTER ON TO(1))  
LEN - NUMBER OF CHARACTERS IN STRING TO BE MOVED  
IRC - OPTIONAL ERROR RETURN CODE  
0 - NO ERROR, STRING MOVED  
1 - IFROM LE 0  
2 - ITO LE 0  
3 - LEN LE 0

CM REQUIRED: 71B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND            LOCF            MOD            OR            SHIFT  
OTHERS  
NONE

EXAMPLE

FROM: ABCDEFGHIJKLMNOPQRSTUVWXYZ    TO: \*\*\*\*\*  
AFTER CALL MOVSTR (FROM, 5, TO, 12, 4, IRC)  
FROM: ABCDEFGHIJKLMNOPQRSTUVWXYZ    TO: \*\*\*\*\*EFGH\*\*\*\*\*  
IRC : 0

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/04/76

DATE(S) REVISED

04/04/77 - MAKE IRC OPTIONAL

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY:    NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY:    NSRDC

SUBROUTINE 'MSET'

PURPOSE

SET A SINGLE WORD (BY ABSOLUTE ADDRESS) IN USER'S FL

FUNCTIONAL CATEGORIES: K2

USAGE

CALL MSET (ADDR, NEW)

DESCRIPTION OF PARAMETERS

ADDR - ADDRESS IN USER'S FL TO BE SET

NEW - WORD TO BE PUT INTO 'ADDR'

REMARKS

'MSET' IS AN ENTRY POINT IN 'CMDRCT'.

NO ERROR CHECKING IS DONE.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

NONE

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 11B (INCLUDES 'MFETCH')

AUTHOR

? - NWL:

DATE WRITTEN:

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'MXGET'

PURPOSE

EXTRACT (RIGHT-JUSTIFIED, ZERO-FILLED) 0-10 6-BIT  
CHARACTERS FROM 60-BIT WORDS

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS

CDC 6000

REMARKS

NONE

USAGE

MXGET (WORD, START, NCHAR)

DESCRIPTION OF PARAMETERS

WORD - WORD FROM WHICH CHARACTERS ARE TO BE EXTRACTED  
START - STARTING CHARACTER  
(LEFT-MOST CHARACTER IS POSITION 1)  
NCHAR - NUMBER OF CHARACTERS TO EXTRACT (0-10)  
MXGET - WILL CONTAIN ONE OF:  
-1 -- START OR NCHAR OR START+NCHAR INVALID  
0 -- IF NCHAR IS 0  
XXX -- EXTRACTED CHARACTER STRING, R-FORMAT

CM REQUIRED: 26B

EXAMPLES

1) EXTRACT CHARACTERS 3-7 FROM A WORD CONTAINING  
'ABCDEFGHIJ':

DATA WORD/ "ABCDEFGHIJ"/

ICHARS = MXGET (WORD, 3, 5)

ICHARS WILL CONTAIN 'CDEFG' (0000 0000 0003 0405 0607B)

2) EXTRACT 'THIS' FROM 'THISSTRING':

DATA IWORD/ "THISSTRING"/

IF (MXGET(IWORD,1,4) .EQ. 4RTHIS) ...

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND SHIFT

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/17/79

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'NEWDAT'

PURPOSE

ADD/SUBTRACT SPECIFIED NUMBER OF DAYS TO/FROM A GIVEN DATE

FUNCTIONAL CATEGORIES: M2

USAGE

CALL NEWDAT (FMT, OLD, NEW, OCENT, NCENT, ADD)

DESCRIPTION OF PARAMETERS

FMT - FORMAT OF DATE (INTEGER)

1 - 'MM/DD/YY'

2 - 'MM/DD/YY'

OLD - OLD DATE (MM/DD/YY)

NEW - NEW DATE

OCENT - OLD CENTURY (E.G., INTEGER 1900)

NCENT - NEW CENTURY (E.G., INTEGER 1900)

ADD - NUMBER OF DAYS TO ADD  
(NEGATIVE TO SUBTRACT)

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

JGDATE - JULIAN/GREGORIAN DATE CONVERTER (MULTI-YEAR)

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 156B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 1968

DATE(S) REVISED

02/73 - CONVERT TO SCOPE 3.3

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'NFILL'

PURPOSE

FILL ELEMENTS 1 THRU N OF AN ARRAY WITH THE VALUES 1 THRU N,  
RESPECTIVELY

FUNCTIONAL CATEGORIES: A1

USAGE

CALL NFILL (A, N)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE FILLED

N - NUMBER OF ELEMENTS TO BE FILLED

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

LANGUAGE: CDC 6000 CP COMPASS

CM REQUIRED: 6B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 08/09/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'NFILLT'  
SUBROUTINE 'NFILLT'

PURPOSE

TEST AN ARRAY FOR THE PRESENCE OF THE INTEGERS 1 THRU N  
IN ELEMENTS 1 THRU N, RESPECTIVELY

FUNCTIONAL CATEGORIES: M5

USAGE

ISUB = NFILLT (A, N, I)  
CALL NFILLT (A, N, I)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE SCANNED  
N - NUMBER OF ELEMENTS TO TEST  
I - =0 - A(1) THRU A(N) CONTAIN 1 THRU N  
      >0 - A(I) IS FIRST ELEMENT TO FAIL TEST  
NFILLT - IF USED AS A FUNCTION, WILL RETURN THE SAME VALUE  
          AS 'I'

REMARKS

A SUGGESTED USE OF THIS ROUTINE IS IN CONJUNCTION WITH ONE  
OF THE SORTING ROUTINES TO DETERMINE IF THE ARRAY BEING  
SORTED WAS ALREADY IN ORDER.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV EXTENDED

CM REQUIRED: 40B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 08/19/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'NUMEXEC'

PURPOSE

GET NUMBER OF EXECUTE CARD PARAMETERS WHICH WERE USED IN  
THIS EXECUTION OF THE PROGRAM

FUNCTIONAL CATEGORIES: Q0

USAGE

CALL NUMEXEC (NEXEC)

DESCRIPTION OF PARAMETER

NEXEC - WILL RETURN THE NUMBER OF EXECUTE CARD PARAMETERS

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

MFETCH - GET SPECIFIED WORD OF USER'S FL

ARITHMETIC STATEMENT FUNCTIONS

R38FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

LANGUAGE: FORTRAN IV

METHOD

THE NUMBER OF PARAMETERS IS IN THE RIGHTMOST 18 BITS OF  
WORD RA+52 (64B) IN THE USER'S FL.

CM REQUIRED: 16B

AUTHOR

DAVID V SOMMER - NSRDC CODE 1892.2

DATE WRITTEN: 04/15/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

TAPE LABELLED CSYSNSRDCPL; P.F. NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC



SUBROUTINE 'NUMVAR'

PURPOSE

GET THE NUMBER OF ARGUMENTS THAT WERE PASSED TO THE ROUTINE  
WHICH CALLED NUMVAR

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: CDC 6000 CP COMPASS

COMPUTERS

CDC 6000

REMARKS

WHEN USED, IT SHOULD PRECEDE OTHER EXECUTABLE STATEMENTS IN  
THE SUBPROGRAM TO INSURE THAT THE REGISTERS HAVE NOT BEEN  
DESTROYED.

USAGE

CALL NUMVAR (NARGS)

DESCRIPTION OF PARAMETER

NARGS - WILL CONTAIN THE NUMBER OF ARGS IN THE ROUTINE  
WHICH CALLED NUMVAR

CM REQUIRED: 5B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

NONE

AUTHOR

MIKE CHERNICK

DATE WRITTEN: UNKNOWN

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'OFMTDE'

PURPOSE

FAST O-FORMAT DECODE

FUNCTIONAL CATEGORIES: I2

USAGE

VARIABLE = OFMTDE (IWORD, ISTART, NCHAR)

DESCRIPTION OF PARAMETERS

VARIABLE - WILL CONTAIN THE RESULT RIGHT-JUSTIFIED  
OR -1 IF NON-OCTAL DIGIT FOUND  
OR -2 IF ISTART IS OUT OF RANGE  
OR -3 IF ISTART+NCHAR GREATER THAN 10.  
(IF VARIABLE IS INTEGER, OFMTDE MUST BE DECLARED  
INTEGER IN THE CALLING PROGRAM)  
IWORD - WORD FROM WHICH THE FIELD WILL BE EXTRACTED  
ISTART - FIRST CHARACTER POSITION OF FIELD WITHIN IWORD  
(1-10)  
NCHAR - NUMBER OF CHARATERS IN FIELD (1-10)  
(ISTART+NCHAR MUST BE LESS THAN 11)

EXAMPLE

VARIABLE = OFMTDE (10L1234567654, 6, 3) WILL PRODUCE  
VARIABLE = 0000 0000 0000 0000 0676B

VARIABLE = OFMTDE (5L123.4, 3, 3) WILL PRODUCE  
VARIABLE = 7777 7777 7777 7777 7776B

VARIABLE = OFMTDE (IWORD, 0, 5) WILL PRODUCE  
VARIABLE = 7777 7777 7777 7777 7775B

VARIABLE = OFMTDE (IWORD, 3, 8) WILL PRODUCE  
VARIABLE = 7777 7777 7777 7777 7774B

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

LANGUAGE: FORTRAN IV

CM REQUIRED: 76B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/24/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

08/22/77

2-152

OFMTDE - 1 OF 1

FUNCTION 'OFMTV'

PURPOSE

FAST O-FORMAT DECODE OF VARIABLE LENGTH INPUT

FUNCTIONAL CATEGORIES: I2

USAGE

VARIABLE = OFMTV (I)

DESCRIPTION OF PARAMETERS

VARIABLE - WILL CONTAIN THE RESULT RIGHT-JUSTIFIED  
OR -1 IF A NON-OCTAL DIGIT FOUND.  
IF VARIABLE IS INTEGER, OFMTV MUST BE  
DECLARED INTEGER IN THE CALLING PROGRAM.  
I - WORD OF OCTAL DIGITS ENDING WITH AN OCTAL  
00B. (EG, 3L123, 9L123456701)

EXAMPLE

VARIABLE = OFMTV (5L12345) WILL RETURN  
VARIABLE = 0000 0000 0000 0001 2345B

VARIABLE = OFMTV (1L+) WILL RETURN  
VARIABLE = 7777 7777 7777 7777 7776B

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 35B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/24/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'OPLSA'

PURPOSE

ORTHOGONAL POLYNOMIAL LEAST SQUARE APPROXIMATION

FUNCTIONAL CATEGORIES: E2

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

THE APPROXIMATING POLYNOMIAL IS

$$C(1)+C(2)*X+C(3)*X**2+...+C(M+1)*X**M$$

FOR MORE THAN 9TH DEGREE OR MORE THAN 30 DATA POINTS, THE  
SOURCE PROGRAM MUST BE REDIMENSIONED.

USAGE

CALL OPLSA (N, W, X, F, M, D, A, C)

DESCRIPTION OF PARAMETERS

N - NUMBER OF DATA POINTS (MAX: 30)

W - ARRAY OF N WEIGHTS

X - ARRAY OF N DATA POINTS

F - ARRAY OF N FUNCTION VALUES

M - DESIRED DEGREE OF POLYNOMIAL (MAX: 9)

D - OUTPUT ARRAY OF COEFFICIENTS OF POLYNOMIALS  $O(J,X)$   
(DIMENSION: 10,N)

A - OUTPUT ARRAY OF COEFFICIENTS OF  $O(J,X)$ 'S OF LEAST  
SQUARE POLYNOMIALS (DIMENSION: M+1)

C - ARRAY TO CONTAIN COEFFICIENTS OF RESULTING LEAST SQUARE  
POLYNOMIAL (SEE REMARKS) (DIMENSION: M+1)

CM REQUIRED: 755B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHORS

UNIVERSITY OF MARYLAND

S VOIGT

DATE WRITTEN: 1971

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED: CLIBRARYUPD3.D=HY  
(\*DECK AMOPLSA)

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'OVLNAME'

PURPOSE

GET NAME OF FILE CURRENTLY BEING EXECUTED

FUNCTIONAL CATEGORIES: Q0

USAGE

CALL OVLNAME (I)

DESCRIPTION OF PARAMETER

I - WILL CONTAIN THE LOCAL FILE NAME CURRENTLY BEING  
EXECUTED

REMARKS

'I' MAY BE USED AS THE FIRST ARGUMENT IN 'CALL OVERLAY'

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

LANGUAGE: CDC 6000 COMPASS

METHOD

THE FILE NAME IS EXTRACTED FROM BITS 59-18 OF WORD  
RA+64B IN THE USER'S FIELD LENGTH

CM REQUIRED: 3

AUTHOR

? - NWL

DATE WRITTEN: ?

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

TAPE LABELLED CSYSNSRDCPL: P.F. NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'PARGET'

## PURPOSE

GET ALL PARAMETERS OF USER-SUPPLIED PARAMETER STRING

FUNCTIONAL CATEGORIES: M4

## USAGE

CALL PARGET (IAREA, LAREA, IPARAM, NPARAM, ISEP, RSEP, LSEP)  
CALL PARGET (IAREA, LAREA, IPARAM, NPARAM, ISEP, RSEP)  
CALL PARGET (IAREA, LAREA, IPARAM, NPARAM, ISEP)  
CALL PARGET (IAREA, LAREA, IPARAM, NPARAM)

## DESCRIPTION OF PARAMETERS

IAREA - AREA CONTAINING PARAMETER LIST TO BE EXTRACTED  
LAREA - NUMBER OF WORDS IN 'IAREA' (16 MAX)  
IPARAM - ARRAY TO CONTAIN PARAMETERS  
(IF IT IS NOT KNOWN WHETHER THE PARAMETER LIST IN  
IAREA CONTAINS A TERMINATOR ('.' OR ')') OR NOT,  
THEN IPARAM, ISEP, LSEP AND RSEP SHOULD BE  
DIMENSIONED AT LEAST 10 TIMES LAREA. THIS WILL  
ALLOW FOR THE WORST POSSIBLE CASE (IAREA ALL  
BLANKS).)  
NPARAM - WILL BE NUMBER OF PARAMETERS FOUND  
ISEP - IF PRESENT, ARRAY TO CONTAIN A CODE IDENTIFYING  
THE SEPARATOR FOUND FOLLOWING THE CORRESPONDING  
PARAMETER

DEC	OCT	SEPARATOR
1	.1	.
2	2	=
3	3	/
4	4	(
5	5	+
6	6	-
7	7	BLANK
8	10B	:
14	16B	OTHER
15	17B	. OR ) (TERMINATOR)

RSEP - IF PRESENT, ARRAY TO CONTAIN THE SEPARATOR  
FOUND (1R FORMAT)  
LSEP - IF PRESENT, ARRAY TO CONTAIN THE SEPARATOR  
FOUND (1L FORMAT)

REMARKS  
NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

LOCF  
OTHERS  
EXTPRM - EXTRACT THE NEXT PARAMETER

ARITHMETIC STATEMENT FUNCTIONS  
NONE

CM REQUIRED: 1066

AUTHOR

DAVID V SOMMER - CODE 1892.2

DATE WRITTEN: 04/11/74

DATE(S) REVISED

11/18/75 - NAME CHANGED FROM GETPAR TO PARGET TO AVOID  
CONFLICT WITH SYSIO ROUTINE OF SAME NAME

06/24/76 - PROCESSING OF OPTIONAL PARAMETERS MODIFIED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'PFC'

PURPOSE

SUPPLY DESCRIPTION OF PERMANENT FILE FUNCTION RETURN CODE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

THE DESCRIPTIONS ARE THOSE FOUND IN THE "NOS/BE VERSION 1  
REFERENCE MANUAL" (G0493800 11) ON PAGE 83.

USAGE

CALL PFC (IRC, A)

DESCRIPTION OF PARAMETERS

IRC - RETURN CODE FROM THE PERMANENT FILE FUNCTION

A - 5-WORD ARRAY WHICH WILL CONTAIN THE DESCRIPTION OF THE  
SUPPLIED 'IRC'

IF 'IRC' IS INVALID, 'UNKNOWN RETURN CODE' IS  
RETURNED

CM REQUIRED: 1075B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

MOVEIT

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 05/18/76

DATE(S) REVISED

02 14 77 - UPDATE FOR NOS/BE 1.0

07 15 80 - UPDATE FOR NOS/BE 1.4 (LEVEL 508)

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC



## SUBROUTINE 'PLOTPR'

### PURPOSE

PRODUCE PRINTER PLOTS WHICH MAY HAVE:

- 1) ANY NUMBER OF PLOTS PER RUN
- 2) ANY NUMBER OF VALUES FOR THE INDEPENDENT VARIABLE
- 3) UP TO 9 DEPENDENT VARIABLES PER PLOT.

FUNCTIONAL CATEGORIES: J5

LANGUAGE: FORTRAN IV

### USAGE

```
COMMON /PLO/ NRUN, NPLOT, ITP(6), ITY(6), ITX(6),  
             NUMPAG, MAXSCA, SCA(10), FROM(10)
```

```
CALL INITPLO
```

```
C SET ANY SPECIAL VALUES IN COMMON /PLO/ AFTER 'CALL INITPLO'
```

```
C WRITE DATA FOR THE PLOT
```

```
DO 5 I=1,NOPTS
```

```
5 WRITE (NFILE) VARIND(I), VARDEP1(I), ..., VARDEPN(I)
```

```
CALL PLOTPR (NFILE, NUMVAR, IVAR)
```

### DESCRIPTION OF PARAMETERS

NFILE - FORTRAN LOGICAL UNIT NUMBER OF FILE CONTAINING  
THE DATA VALUES, INDEPENDENT FOLLOWED BY DEPENDENT

NUMVAR - NUMBER OF VARIABLES (UP TO 10)  
(TOTAL: INDEPENDENT + DEPENDENT)

IVAR - 10-WORD ARRAY WITH ALPHANUMERIC NAMES FOR THE  
VARIABLES WHICH WILL APPEAR ON THE PLOT

ADDITIONAL INFORMATION IS PROVIDED THRU LABELLED COMMON  
BLOCK /PLO/

NRUN - NUMBER OF THIS RUN (DEFAULT: 1)

NPLOT - NUMBER OF PLOT (DEFAULT: 1)

ITP - PAGE TITLE (DEFAULT: BLANK)

ITY - Y TITLE (DEFAULT: BLANK)

ITX - X TITLE (DEFAULT: BLANK)

(TITLE ARRAYS ARE 6 WORDS EACH OF UP TO 6  
CHARACTERS PER WORD - 6A6 FORMAT)

NUMPAG - NUMBER OF DOUBLE PAGES TO SPREAD THE PLOT  
OVER (NO MORE THAN 100 POINTS PER PAGE)  
(DEFAULT: 1)

MAXSCA - SCALING OPTION

1 - OPTIMUM SCALING IS CALCULATED FOR EACH  
VARIABLE (DEFAULT)

2 - PLOT ALL DEPENDENT VARIABLES ON THE  
SAME SCALE

(IF THE PROGRAMMER SCALES ANY OF THE  
DEPENDENT VARIABLES, THIS OPTION IS DEFAULTED)



SCA AND FROM -

ARRAYS CONTAINING THE INCREMENTS AND THE  
STARTING VALUES FOR EACH VARIABLE.  
IF ONE OF THESE ARRAYS IS USED FOR A VARIABLE,  
BOTH MUST BE USED.  
IF THERE ARE MORE THAN 101 VALUES FOR THE  
INDEPENDENT VARIABLE, THOSE VALUES MUST HAVE A  
CONSTANT INCREMENT AND THE SCALING IS ALWAYS  
BASED ON THAT INCREMENT.  
(DEFAULT: OPTIMUM SCALE AND STARTING VALUE  
ARE CALCULATED FOR EACH VARIABLE)

REMEMBER TO PUT 'TAPENFILE' INTO PROGRAM STATEMENT OF THE  
MAIN PROGRAM.

CM REQUIRED: 1202B

REMARKS

A CALL TO 'INITPLO' WILL SET THE DEFAULT VALUES.

THE MINIMUM SIZE OF A GRID IS 101 X 101 POINTS (THIS IS  
1-1/2 COMPUTER PAGES). IF MORE THAN 101 VALUES FOR THE  
INDEPENDENT VARIABLE ARE GIVEN, THE REQUIRED INTEGRAL  
NUMBER OF 100-POINT GRIDS ARE AUTOMATICALLY JOINED TOGETHER.

THE NAME AND VALUES OF THE INDEPENDENT VARIABLE (AND  
X TITLE) ARE GIVEN IN THE LEFT MARGIN. THE NAMES, SCALES  
AND PLOTTING CHARACTERS (A-I) FOR THE DEPENDENT VARIABLES  
ARE GIVEN AT THE TOP OF THE PAGE WITH THE PAGE TITLE AND  
Y TITLE ABOVE THEM.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

ABS	ALOG10	AMAX1	AMIN1	AND
COMPL	EOF	OR	REWIND	SHIFT

OTHERS

DRAWGD	( 221B CM)
INITGD	( 47B CM)
INITPLO	( 21B CM)

AUTHOR

ADAPTED FROM MIMIC BY ANN BANDURSKI - NSRDC CODE 1833

DATE WRITTEN: 05/22/72

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED: CLIBRARYUPD3  
(\*DECK AMPLOTP)

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'POLYN'

## PURPOSE

LEAST SQUARES POLYNOMIAL FIT

FUNCTIONAL CATEGORIES: E2

LANGUAGE: FORTRAN IV

## REMARKS

FIT AN N-TH DEGREE POLYNOMIAL TO SETS OF POINTS (X(I), Y(I), Z(I), ...), WHERE X IS THE INDEPENDENT VARIABLE IN EACH CASE, (I=1,2,...,N).

$$PN(X) = A(0) + A(1)*X + A(2)*X**2 + \dots + A(N)*X**N$$

## USAGE

CALL POLYN (ND, NP, NC, X, Y, NAPT, WORKA, V, SUM)

## DESCRIPTION OF PARAMETERS

- ND - DEGREE OF POLYNOMIAL (N)
- NP - NUMBER OF POINTS IN SET OF OBSERVATIONS (X(I), Y(I), Z(I), ...)
- NC - NUMBER OF CURVES TO BE FITTED (E.G., Y, Z, ...)
- X - ARRAY CONTAINING THE INDEPENDENT VARIABLE
- Y - ARRAY CONTAINING THE DEPENDENT VARIABLE(S) MUST BE DIMENSIONED AT LEAST NP TIMES NC. Y(1), Y(2), ... MUST BE CONTIGUOUS IN MEMORY. Z(1) NEED NOT FOLLOW Y(N) IMMEDIATELY.
- NAPT - NUMBER OF LOCATIONS BETWEEN SETS OF DATA Y, Z, ... (NUMBER OF WORDS BETWEEN Y(1) AND Z(1).) ALL SETS Y, Z, ... MUST BE EQUALLY SPACED.
- WORKA - WORK ARRAY USED IN MATRIX SOLUTION OF THE (ND+1) SETS OF LINEAR EQUATIONS. MUST BE DIMENSIONED AT LEAST (ND+1)\*\*2.
- V - OUTPUT ARRAY USED IN MATRIX SOLUTION FOR VECTOR. MUST BE DIMENSIONED AT LEAST (ND+1) TIMES NC. V(1), ..., V(ND+1) WILL CONTAIN COEFFICIENTS A(0), ..., A(N) OF THE FIRST CURVE.
- SUM - WORK ARRAY FOR SUMS OF POWERS OF X. MUST BE DIMENSIONED AT LEAST (2\*ND+1).

CM REQUIRED: 233B (+ 170B FOR ENXEN)

## METHOD

LEAST SQUARES - MINIMIZING SUM OF SQUARES OF DEVIATIONS FROM AVERAGE.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
NONE  
PART OF PROGRAM  
ENXEN  
OTHERS  
NONE

AUTHOR  
J. N. BROOKS (SHARE ROUTINE NUMBER 848)

DATE WRITTEN: 01/29/60

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED CLIBRARYUPD:  
(\*DECK ARPLN1)

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'PROOT'

## PURPOSE

FIND ALL ROOTS OF A REAL POLYNOMIAL

FUNCTIONAL CATEGORIES: C2 B4

LANGUAGE: FORTRAN IV

## REMARKS

THE POLYNOMIAL HAS THE FORM:

$$A_1 + A_2 X + \dots + A_{N+1} X^{N+1} = 0$$

## USAGE

CALL PROOT (N, A, U, V, H, B, C, CONV, NPLUS2)

## DESCRIPTION OF PARAMETERS

- N - DEGREE OF THE POLYNOMIAL TO BE SOLVED
- A - ARRAY (DIMENSIONED N+2) CONTAINING THE COEFFICIENTS IN THE ORDER INDICATED ABOVE
- U - ARRAY (DIMENSIONED N+2) WHICH WILL CONTAIN THE REAL PARTS OF THE ROOTS
- V - ARRAY (DIMENSIONED N+2) WHICH WILL CONTAIN THE IMAGINARY PARTS OF THE ROOTS
- H,B,C - WORK ARRAYS (EACH DIMENSIONED N+2)
- CONV - CONVERGENCE CRITERION. INITIALLY SET BY PROOT TO 1.0E-35 (FAR BELOW THE ACTUAL STARTING CONVERGENCE CRITERION OF 5.0E-20 (CDC 6600)). IF THE POLYNOMIAL HAS NOT CONVERGED AFTER A PRESCRIBED NUMBER OF TRIES, THE CONVERGENCE CRITERION IS RELAXED. IF, UPON EXIT FROM PROOT, CONV IS NOT 1.0E-35, THE CONVERGENCE CRITERION HAS BEEN RELAXED TO THE NUMBER GIVEN.
- NPLUS2 - MUST BE SET TO N+2

CM REQUIRED: 463B

## METHOD

THE ROUTINE CONVERGES SIMULTANEOUSLY TOWARD A LINEAR FACTOR AND A QUADRATIC FACTOR BY NEWTON'S AND BAIRSTOW'S METHODS, RESPECTIVELY. WHEN A ROOT IS FOUND BY ONE METHOD, ITERATION CONTINUES WITH BOTH METHODS USING THEIR MOST RECENT GUESSES.

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

ABS            SIGN            SQRT  
OTHERS  
NONE

AUTHORS

MIRIAM SHAPIRO

HARVEY ABRAMSON - NEW YORK UNIVERSITY

DATE WRITTEN: UNKNOWN - ADAPTED FROM LOS ALAMOS ROUTINE  
LA-PROOT BY T. L. VORDAN (MS)

DATE(S) REVISED

11/65 - CONVERTED TO CDC 6600 (HA)

LOCATION OF DECKS

SOURCE

TAPE LABELLED: CLIBRARYUPD3

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'PRTFL'

PURPOSE

PRINT CURRENT FL (OR PUT INTO DAYFILE)

FUNCTIONAL CATEGORIES: Q0 J2

USAGE

CALL PRTFL (IOUT)

DESCRIPTION OF PARAMETER

IOUT - FORTRAN LOGICAL UNIT NUMBER  
(0=PUT INTO DAYFILE; N=WRITE ON TAPEN)

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

REMARK

OTHERS

FTNRFL - GET CURRENT FL

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 50B

AUTHOR

DAVID V SOMMER - NSRDC CODE 1892.2

DATE WRITTEN: 04/16/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'PRTIME'

## PURPOSE

GET AND PRINT CPA, CPB, CP, PP, IO AND WALL CLOCK TIMES  
SINCE LAST CALL AND PRINT USER-SUPPLIED MESSAGE

FUNCTIONAL CATEGORIES: Q4 J4 NO

## USAGE

CALL PRTIME (IUNIT, TIMES, MSG)  
CALL PRTIME (IUNIT, TIMES, 0)

## DESCRIPTION OF PARAMETERS

IUNIT - OUTPUT UNIT FOR PRINTED LINE  
(EITHER FORTRAN LOGICAL UNIT NUMBER (1-99) OR  
1- TO 7-CHARACTER LOCAL FILE NAME, LEFT-ADJ,  
ZERO-FILLED (E.G., 6LOUTPUT))

TIMES - 7-WORD ARRAY TO CONTAIN THE FOLLOWING:  
1 - ELAPSED CPA TIME IN SECONDS  
2 - ELAPSED CPB TIME IN SECONDS  
3 - ELAPSED CP TIME IN SECONDS (CPA+CPB)  
4 - ELAPSED PP TIME IN SECONDS  
5 - ELAPSED IO TIME IN SECONDS  
6 - ELAPSED WALL CLOCK TIME ( HH.MM.SS.)  
7 - ELAPSED WALL CLOCK TIME IN SECONDS

MSG - 5-WORD MESSAGE TO BE PRINTED  
(IF SUPPLIED AS HOLLERITH CONSTANT, MAY BE FEWER  
THAN 5 WORDS. SEE EXAMPLE BELOW)  
(IF MSG(1) IS 0 (OR 1L0 OR 1H0), HEADINGS, BUT NOT  
TIMES, WILL BE PRINTED.)

## REMARKS

NONE

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

ELTIME - GET ELAPSED TIME SINCE LAST CALL  
FINDCHR - FIND FIRST OCCURRENCE OF CHARACTER IN ARRAY

## ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

## OUTPUT UNITS

UNIT	#	LFN	USE
-----	-----	-----	-----
USER SPECIFIES...			LISTABLE OUTPUT

CM REQUIRED: 102B



EXAMPLE

```
PROGRAM TEST (OUTPUT=128, .....  
REAL TIMES(7)  
C  GET INITIAL TIMES AND PRINT HEADING  
   CALL PRTIME (6LOUTPUT, TIMES, 0)  
  
C  GET ELAPSED TIMES AND PRINT WITH MESSAGE  
   CALL PRTIME (6LOUTPUT, TIMES, "TEST NUMBER 1")  
  
C  NEW HEADINGS ARE NOT NEEDED, SO CALL ELTIME DIRECTLY  
   CALL ELTIME (TIMES)  
  
C  GET ELAPSED TIMES AND PRINT WITH MESSAGE  
   CALL PRTIME (6LOUTPUT, TIMES, "TEST NUMBER 2")  
  
END
```

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/20/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'PUTCHA'  
FUNCTION 'PUTCHA'

PURPOSE

INSERT CHARACTER INTO SPECIFIED POSITION IN AN ARRAY

FUNCTIONAL CATEGORIES: M4

USAGE

CALL PUTCHA (A, N, CH)  
VARIABLE = PUTCHA (A, N, CH)

DESCRIPTION OF PARAMETERS

A - ARRAY INTO WHICH CHARACTER IS TO BE INSERTED  
N - POSITION AT WHICH CHARACTER IS TO BE INSERTED  
(POSITION 1 IS LEFT-MOST 6-BIT CHARACTER IN A(1))  
CH - CHARACTER TO BE INSERTED (IN 1R FORMAT)  
(WHEN USED AS A FUNCTION, PUTCHA WILL CONTAIN THE WORD  
IN 'A' WHICH WAS CHANGED)

REMARKS

'PUTCHA' IS AN ENTRY POINT IN 'GETCHA'.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

SHIFT  
OTHERS  
NONE

ARITHMETIC STATEMENT FUNCTIONS  
NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 52B (UNLESS GETCHA IS ALSO CALLED)

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/16/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE  
UPDATE LIBRARY: NSRDCPL.ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

AD-A103 028

DAVID W TAYLOR NAVAL SHIP RESEARCH AND DEVELOPMENT CE--ETC. F/6 9/2  
COMPUTER CENTER CDC LIBRARIES/NSRDC (SUBPROGRAMS). (U)

FEB 81 D V SOMMER

UNCLASSIFIED

DTNSRDC/CMLD-81-07

NL

373  
AD-A103 028




END  
DATE  
FILMED  
81  
DTIC

SUBROUTINE 'PUTCHR'  
FUNCTION 'PUTCHR'

PURPOSE

INSERT CHARACTER INTO SPECIFIED POSITION IN A WORD

FUNCTIONAL CATEGORIES: M4

USAGE

CALL PUTCHR (A, N, CH)  
VARIABLE = PUTCHR (A, N, CH)

DESCRIPTION OF PARAMETERS

A - WORD INTO WHICH CHARACTER IS TO BE INSERTED  
N - POSITION AT WHICH CHARACTER IS TO BE INSERTED  
(POSITION 1 IS LEFT-MOST 6-BIT CHARACTER IN A)  
CH - CHARACTER TO BE INSERTED (IN 1H FORMAT)  
(WHEN USED AS A FUNCTION, PUTCHR WILL CONTAIN THE SAME  
AS 'A')

REMARKS

'PUTCHR' IS AN ENTRY POINT IN 'GETCHR'.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 43B (UNLESS GETCHR IS ALSO CALLED)

AUTHOR

FROM BIMED PACKAGE

DATE WRITTEN:

DATE(S) REVISED

1975 - DAVID V SOMMER - DTNSRDC CODE 1892.2

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'QSORT'

## PURPOSE

IN-CORE ASCENDING SORT FOR REAL ARRAYS LARGER THAN 500 WORDS

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN IV

## USAGE

CALL QSORT (A, I)

## DESCRIPTION OF PARAMETERS

A - REAL ARRAY TO BE SORTED INTO ASCENDING ORDER

I - NUMBER OF WORDS IN 'A' TO BE SORTED

## REMARKS

'QSORT' IS THE MOST EFFICIENT SORT AVAILABLE (AS OF DATE BELOW) FOR THE SORTING IN CORE OF ARRAYS LARGER THAN 500 WORDS.

THIS ROUTINE IS A TRANSLATION OF ALGORITHM 402, COMM. ACM, NOV, 1970.

IF THE JOB ABORTS WITH THE MESSAGE "ABORT IN QSORT WITH MN=<MN>", CHECK IF MN EXCEEDS KL (CURRENTLY KL=46). IF SO, THE VALUE OF KL AND THE DIMENSION OF ARRAY K MUST BE SET HIGHER (TRY DOUBLING IT).

ON THE B7700:

THE SUBROUTINE MUST BE CHANGED AND RECOMPILED.

ON THE CDC:

WRITE A DUMMY SUBROUTINE TO SET KL AND THE DIMENSION OF K GREATER.

THIS SUBROUTINE MIGHT HAVE THE FORM:

```
SUBROUTINE DUMMY
COMMON /QSORT/ KL, K(<NEW>)
KL = <NEW>
RETURN
END
```

A CALL TO THIS SUBROUTINE MUST OCCUR BEFORE ANY CALL TO QSORT; THE BEST PLACE BEING ONE OF THE FIRST STATEMENTS IN THE MAIN PROGRAM.

CM REQUIRED: B7700: 312 + 65B COMMON  
CDC : 232B + 57B COMMON

## ERROR MESSAGE

ABORT IN QSORT WITH MN=<MN>  
SEE REMARKS.

OUTPUT UNIT (B7700)  
UNIT # INTNAME  
-----

USE  
-----

FILE6 ERROR MESSAGE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

DISPLA (CDC)

OTHERS

ZABORT - NON-EXISTENT ROUTINE TO FOREC ABORT

AUTHORS

C FLINK - KPS NWL

DTNSRDC CODE 1892

DATE WRITTEN: 11/25/70 - CF

DATE(S) REVISED

01/30/81 - DVS - ADD DAYFILE ERROR MESSAGE

- CHANGE ABORT PROCESS

02/17/81 - DVS - CONVERT TO B7700

LOCATION OF DECKS

SOURCE

B7700: \*SOURCE/NSRDC/QSORT1

CDC : UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

B7700: \*NSRDC/QSORT1

CDC : EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'QSORT1'

## PURPOSE

IN-CORE ASCENDING SORT WITH RE-ORDERING OF ASSOCIATED ARRAY  
(FOR REAL ARRAYS LARGER THAN 500 WORDS)

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN IV

## USAGE

CALL QSORT1 (A, I, T)

## DESCRIPTION OF PARAMETERS

A - REAL ARRAY TO BE SORTED INTO ASCENDING ORDER  
I - NUMBER OF WORDS IN 'A' TO BE SORTED  
T - ASSOCIATED ARRAY TO BE REORDERED

## REMARKS

'QSORT1' IS THE MOST EFFICIENT SORT AVAILABLE (AS OF DATE  
BELOW) FOR THE SORTING IN CORE OF ARRAYS LARGER THAN 500  
WORDS.

THIS ROUTINE IS A TRANSLATION OF ALGORITHM 402, COMM. ACM  
NOV. 1970.

IF THE ARRAY 'T' IS NOT NEEDED, USE 'QSORT'.

IF THE JOB ABORTS WITH THE MESSAGE "ABORT IN QSORT1 WITH  
MN=<MN>", CHECK IF MN EXCEEDS KL (CURRENTLY KL=46).  
IF SO, THE VALUE OF KL AND THE DIMENSION OF ARRAY K MUST BE  
SET HIGHER (TRY DOUBLING IT).

ON THE B7700:

THE SUBROUTINE MUST BE CHANGED AND RECOMPILED.

ON THE CDC:

WRITE A DUMMY SUBROUTINE TO SET KL AND THE DIMENSION OF K  
GREATER.

THIS SUBROUTINE MIGHT HAVE THE FORM:

```
SUBROUTINE DUMMY
COMMON /QSORT/ KL, K(<NEW>)
KL = <NEW>
RETURN
END
```

A CALL TO THIS SUBROUTINE MUST OCCUR BEFORE ANY CALL TO  
QSORT1; THE BEST PLACE BEING ONE OF THE FIRST STATEMENTS  
IN THE MAIN PROGRAM.

CM REQUIRED: B7700: 362 + 65B COMMON  
CDC : 220B + 57B COMMON

OUTPUT UNIT (B7700)  
UNIT # INTNAME  
-----  
FILE6

USE  
-----  
ERROR MESSAGE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

DISPLA (CDC)

OTHERS

ZABORT - NON-EXISTENT ROUTINE TO FOREC ABORT

AUTHORS

C FLINK - KPS NWL

DTNSRDC CODE 1892

DATE WRITTEN: 11/30/70

DATE(S) REVISED

01/30/81 - DVS - ADD DAYFILE ERROR MESSAGE

- CHANGE ABORT PROCESS

02/17/81 - DVS - CONVERT TO B7700

LOCATION OF DECKS

SOURCE

B7700: \*SOURCE/NSRDC/QSORT1

CDC : UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

B7700: \*NSRDC/QSORT1

CDC : EDITLIB USER LIBRARY: NSRDC



# SUBROUTINE 'QUADG'

## PURPOSE

INTEGRAL BY GAUSS-LEGENDRE 10-POINT QUADRATURE

FUNCTIONAL CATEGORIES: D1

LANGUAGE: FORTRAN IV EXTENDED

## REMARKS

APPROXIMATES

$$\text{INTEGRAL } F(X) \, DX = \frac{XU-XL}{2} * \text{SUM } \phi \, WI * F\left(\frac{ZI(XU-XL)+XU+XL}{2}\right) !$$

WHERE WI ARE WEIGHT FACTORS

ZI ARE ROOTS OF LEGENDRE POLYNOMIAL

INTEGRAL IS FROM XL TO XU.

## USAGE

CALL QUADG (XL, XU, FNC, Y)

## DESCRIPTION OF PARAMETERS

XL - LOWER LIMIT OF INTEGRATION

XU - UPPER LIMIT OF INTEGRATION

FNC - THE EXTERNAL FUNCTION FOR EVALUATING THE INTEGRAND  
F(X)

(USER MUST SUPPLY THE FUNCTION 'FNC' WITH ONE ARGUMENT  
FOR EVALUATING F(X), THE INTEGRAND. FNC MUST BE  
DECLARED EXTERNAL IN THE ROUTINE CALLING QUADG.

Y - THE RESULTING INTEGRAL VALUE

CM REQUIRED: 171B

## METHOD

LET A = .5\*(XU+XL)

B = XU - XL,

THEN, SINCE THE ZI'S ARE SYMMETRIC ABOUT ZERO,

$$Y = B * \text{SUM-FROM-0-TO-4} ((WI/2) * (FNC(A+(ZI/2)*B) + FNC(A-(ZI/2)*B)))$$

## REFERENCE

"APPLIED NUMERICAL METHODS" BY B. CARNAHAN, H. LUTHER  
AND J. WILKES, WILEY, 1969, P. 103.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
NONE  
OTHERS  
NONE

AUTHOR  
SUSAN VOIGT - DTNSRDC CODE 1892

DATE WRITTEN: 09/71

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED: CLIBRARYUPD3,D=HY  
(\*DECK AMQUADG)

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'RCPA'

PURPOSE

READ (A PORTION OF) CONTROL POINT AREA

FUNCTIONAL CATEGORIES: K2

USAGE

CALL RCPA (ISTART, NWORDS, AREA)

DESCRIPTION OF PARAMETERS

ISTART - STARTING WORD IN CONTROL POINT AREA

NWORDS - NUMBER OF WORDS TO READ

AREA - ARRAY TO HOLD THE SPECIFIED WORDS  
(AREA(2) THRU AREA(NWORDS+1))

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 43B

AUTHOR

MIKE GOLDEN - DTNSRDC CODE 1844

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/75

DATE(S) REVISED

12/03/75

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'RECOVRD'

PURPOSE

ON RECOVERY, PRINT EXCHANGE JUMP PACKAGE, RA+0 THRU RA+77B  
AND ENDRUN INDICATOR

FUNCTIONAL CATEGORIES: N2

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

EXTERNAL RECOVRD

CALL RECOVR (RECOVRD, 77B, 0)

...

--OR--

EXTERNAL ANY

CALL RECOVR (ANY, 77B, 0)

SUBROUTINE ANY (EXCHJP, ENDRUN, RAO)

DIMENSION EXCHJP(17)

CALL RECOVRD (EXCHJP, ENDRUN, RAO)

...

DESCRIPTION OF PARAMETERS

EXCHJP - 17-WORD ARRAY TO HOLD EXCHANGE JUMP PACKAGE

ENDRUN - ENDRUN INDICATOR (WILL HAVE MEANING ONLY IF SECOND  
FORM OF USAGE IS USED AND IF ENDRUN IS SET BEFORE  
THE CALL TO RECOVRD)

RAO - RA+0 POINTER (NOT USED BY THIS SUBROUTINE)

CM REQUIRED: 601B

OUTPUT UNITS

LFN USE

-----  
OUTPUT LISTABLE OUTPUT

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

GETRA - GET RA+0 THRU RA+77B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 06/19/74

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'REDUCE'

PURPOSE

REDUCE FL TO MINIMUM OR REQUEST ADDITIONAL FL RELATIVE TO  
START OF BLANK COMMON

FUNCTIONAL CATEGORIES: Q0

USAGE

CALL REDUCE - REDUCE TO FIRST WORD OF BLANK COMMON  
CALL REDUCE (I) - ADJUST TO 'I' WORDS AFTER START OF BLANK  
COMMON

DESCRIPTION OF PARAMETER

I - IF PRESENT, NUMBER OF WORDS PAST START OF BLANK COMMON

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF

SHIFT

OTHERS

MFETCH - GET SPECIFIED WORD IN USER'S FL

MSET - SET SPECIFIED WORD IN USER'S FL

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 36B (PLUS 1 IN BLANK COMMON)

AUTHOR

? - NWL

DATE WRITTEN: ?

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

TAPE LABELLED CSYSNSRDCPL; P.F. NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'REPLAC'

PURPOSE

REPLACE ONE CHARACTER BY ANOTHER IN AN ARRAY

FUNCTIONAL CATEGORIES: M4

USAGE

CALL REPLAC (A, NA, OLD, NEW)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE PROCESSED  
NA - NUMBER OF WORDS IN 'A' TO BE PROCESSED  
OLD - OLD CHARACTER (1R FORMAT)  
NEW - NEW CHARACTER (1R FORMAT)

REMARKS

ALL PARAMETERS ARE TYPE 'INTEGER'

SUBROUTINE AND FUNCTIONS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

L91FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)  
R110FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

LANGUAGE: FORTRAN IV

CM REQUIRED: 57B

AUTHOR

DAVID V. SOMMER - DINSTDC CODE 1892.2

DATE WRITTEN: 1973

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'REPLACM'

PURPOSE

REPLACE OLD CHARACTERS WITH NEW CHARACTERS

FUNCTIONAL CATEGORIES: M4

USAGE

CALL REPLACM (A, NA, OLD, NEW, NCH)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE PROCESSED  
NA - NUMBER OF WORDS IN 'A' TO BE PROCESSED  
OLD - ARRAY OF OLD CHARACTERS (1R FORMAT)  
NEW - ARRAY OF CORRESPONDING NEW CHARACTERS (1R FORMAT)  
NCH - NUMBER OF CHANGE PAIRS (DIMENSION OF 'OLD' AND 'NEW')

REMARKS

ALL ARGUMENTS ARE TYPE 'INTEGER'.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

L91FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

R110FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

LANGUAGE: FORTRAN IV

CM REQUIRED: 73B

AUTHOR

DAVID V SOMMER - NSRDC CODE 1892.2

DATE WRITTEN: 05/21/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC



SUBROUTINE 'REPLHI'

PURPOSE

REPLACE ALL CHARACTERS GREATER THAN SPECIFIED CHARACTER WITH  
NEW CHARACTER

FUNCTIONAL CATEGORIES: M4

USAGE

CALL REPLHI (A, NA, OLD, NEW)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE PROCESSED  
NA - NUMBER OF WORDS IN 'A' TO BE PROCESSED  
OLD - OLD CHARACTER (1R FORMAT)  
NEW - NEW CHARACTER (1R FORMAT)

REMARKS

ALL PARAMETERS ARE TYPE 'INTEGER'

SUBROUTINE AND FUNCTIONS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

L91FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

R110FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

LANGUAGE: FORTRAN IV

CM REQUIRED: 60B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/26/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'REPLLO'

PURPOSE

REPLACE ALL CHARACTERS LESS THAN SPECIFIED CHARACTER WITH  
NEW CHARACTER

FUNCTIONAL CATEGORIES: M4

USAGE

CALL REPLLO (A, NA, OLD, NEW)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE PROCESSED  
NA - NUMBER OF WORDS IN 'A' TO BE PROCESSED  
OLD - OLD CHARACTER (1R FORMAT)  
NEW - NEW CHARACTER (1R FORMAT)

REMARKS

ALL PARAMETERS ARE TYPE 'INTEGER'

SUBROUTINE AND FUNCTIONS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

L91FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

R110FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

LANGUAGE: FORTRAN IV

CM REQUIRED: 60B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/26/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'REPLNE'

PURPOSE

REPLACE ALL CHARACTERS (EXCEPT SPECIFIED CHARACTER) WITH A  
SPECIFIED CHARACTER

FUNCTIONAL CATEGORIES: M4

USAGE

CALL REPLNE (A, NA, OLD, NEW)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE PROCESSED  
NA - NUMBER OF WORDS IN 'A' TO BE PROCESSED  
OLD - OLD CHARACTER (1R FORMAT)  
NEW - NEW CHARACTER (1R FORMAT)

REMARKS

ALL PARAMETERS ARE TYPE 'INTEGER'

SUBROUTINE AND FUNCTIONS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

L91FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

R110FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

LANGUAGE: FORTRAN IV

CM REQUIRED: 57B

AUTHOR

DAVID V SOMMER - DTNSTDC CODE 1892.2

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

## SUBROUTINE 'REQUEST'

### PURPOSE

CALLABLE REQUEST FUNCTION

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: FORTRAN IV EXTENDED

### REMARKS

ASSIGNMENT OF EQUIPMENT MAY BE REQUESTED FROM A RUNNING CENTRAL PROCESSOR PROGRAM BY THE REQUEST SUBROUTINE, WHICH HAS THE EFFECT OF A REQUEST CARD.

FOR FURTHER INFORMATION, CALL

MIKE CHERNICK

(202) 227-1683 OR IDS 150-1683 OR AUTOVON 287-1683

### USAGE

CALL REQUEST (IRC, LFN, ICODE, SN)

CALL REQUEST (IRC, LFN, ICODE)

CALL REQUEST (IRC, LFN)

### DESCRIPTION OF PARAMETERS

- IRC - OUTPUT: RIGHT-JUSTIFIED SYSTEM-GENERATED ERROR RETURN CODE  
IRC=0 - REQUEST WAS SUCCESSFUL
- LFN - CONTENTS DETERMINED BY ICODE  
IF ICODE IS NON-ZERO, LFN IS A 1-7 CHARACTER LOCAL FILE NAME, LEFT-JUSTIFIED, ZERO- OR BLANK-FILLED (E.G., 5LTAPE7).  
IF ICODE IS ZERO (OR MISSING), LFN IS AN ARRAY CONSTRUCTED AS DESCRIBED IN NOS/BE REFERENCE MANUAL, PAGE 7-42 ON.
- ICODE - DETERMINES CONTENTS OF LFN AND EFFECT OF REQUEST  
ICODE 0 OR MISSING - LFN IS AN ARRAY CONTAINING PARAMETERS FOR REQUEST MACRO  
ICODE = "\*Q", 2H\*Q OR 2L\*Q - LFN IS 1-7 CHARACTER LOCAL FILE NAME AND REQUEST HAS EFFECT OF REQUEST, LFN, \*Q.  
ICODE ANYTHING ELSE - LFN IS 1-7 CHARACTER LOCAL FILE NAME AND REQUEST HAS THE EFFECT OF REQUEST, LFN, \*PF.
- SN - OPTIONAL SN (\*PF ONLY)  
WHEN USED, IS 1-7 CHARACTER USER DEVICE SET NAME (HAS EFFECT OF REQUEST, LFN, \*PF, SN=SETNAME.)

CM REQUIRED: 125B

### EXAMPLES

REQUEST, TAPE1, \*PF.                      BECOMES  
CALL REQUEST (IRC, 5LTAPE1, 1)

REQUEST, TAPE2, \*Q.                      BECOMES  
CALL REQUEST (IRC, 5LTAPE2, "\*Q")

REQUEST, TAPE3, \*PF, SN=MYSET1.           BECOMES  
CALL REQUEST (IRC, "TAPE3", "\*PF", "MYSET1")

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
LOCF            SHIFT  
OTHERS  
IZONK           NUMVAR       ZPFMAC

AUTHORS

JAMES BLACK, MIKE CHERNICK - DTNSRDC CODE 1832  
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 05/26/71

DATE(S) REVISED

01/10/75 - V3.5 - MC  
01/27/77 - DVS - ADD \*Q  
03/24/77 - DVS - ADD SN

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY:    NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY:    NSRDC

SUBROUTINE 'RFFT'

PURPOSE

FAST FOURIER TRANSFORM OF A REAL TABULATED FUNCTION

FUNCTIONAL CATEGORIES: E2

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

CALL RFFT (A, M, INV, S, IFERR)

DESCRIPTION OF PARAMETERS

- A - THE ARRAY CONTAINING A REAL TABULATED ONE-DIMENSIONAL FUNCTION. 'A' MUST BE DIMENSIONED AS A POWER OF 2 AND REQUIRES 4 ADDITIONAL LOCATIONS BEYOND THE LENGTH OF THE DATA. TOTAL DIMENSION FOR 'A' IS  $2^{**}(M+1)+4$ .  
ON OUTPUT 'A' CONTAINS THE FOURIER TRANSFORM. A(1) AND A(2) CONTAIN, RESPECTIVELY, THE REAL AND IMAGINARY ZERO-CYCLE COMPONENTS; A(3) AND A(4) CONTAIN THE FUNDAMENTAL FREQUENCY COMPONENTS, ETC.
- M - ONE LESS THAN THE SMALLEST INTEGER BASE 2 LOGARITHM THAT HAS AN ANTILOG WHICH WILL CONTAIN ALL THE ELEMENTS TO BE TRANSFORMED. FOR EXAMPLE, IF THE ARRAY TO BE TRANSFORMED CONTAINS 28 POINTS, M MUST BE SET TO 4.
- INV - SCRATCH ARRAY REQUIRING 1/8 THE DIMENSION OF 'A'
- S - SCRATCH ARRAY REQUIRING 1/8 THE DIMENSION OF 'A'
- IFERR - ERROR RETURN CODE  
= 0 -- NORMAL COMPLETION  
<>0 -- ERRORS IN SUBROUTINE ARGUMENTS

NOTE:  $3 < M < 20$ . THIS IS BASED ON AN ARRAY WHICH HAS A LENGTH THAT CAN BE EXPRESSED AS A POWER OF 2. IF THE DATA OCCUPIES LESS SPACE THAN  $2^{**}(M+1)$ , THE REMAINING LOCATIONS MUST BE SET TO ZERO OR ANOTHER APPROPRIATE CONSTANT.

CM REQUIRED: 320B

## METHOD

THIS OPERATION MAKES USE OF THE SEPARABLE PROPERTIES OF THE FOURIER COEFFICIENTS OF THE REAL AND IMAGINARY COMPONENTS OF THE COMPLEX VECTOR. THIS IS ALMOST A SPECIAL CASE OF THE DUAL USE OF THE COOLEY-TUKEY ALGORITHM DESCRIBED IN REFERENCE 2. REFERENCES TO THIS METHOD CAN BE FOUND IN REFERENCE 3 ALSO.

IN BRIEF, A SCALED VERSION OF THE FIRST PORTION OF THE REAL ARRAY IS PLACED IN THE REAL COMPONENT OF THE VECTOR, WHILE A SCALED VERSION OF THE SECOND PORTION OF THE ARRAY IS PLACED IN THE COMPLEX COMPONENT. THE ALGORITHM IS PERFORMED IN NORMAL FASHION ON THE COMPLEX ARRAY. THE COEFFICIENTS FOR THE REAL ARRAY ARE OBTAINED BY PROPERLY COMBINING AND REORDERING THE FOURIER COEFFICIENTS FROM THE COMPLEX PROCESSING.

## REFERENCES

1. COOLEY, J. W. AND TUKEY, J. W. "AN ALGORITHM FOR THE MACHINE CALCULATION OF COMPLEX FOURIER SERIES," MATH. COMPUT. 19, 90 (APRIL 1965), 297-301.
2. GODFREY, M. D., BINGHAM, C., AND TUKEY, J. W., "MODERN TECHNIQUES OF POWER SPECTRUM ESTIMATION," IEEE TRANS. ON AUDIO AND ELECTROACOUSTICS (JUNE 1967), PP. 56-66.
3. SINGLETON, RICHARD C., "ON COMPUTING THE FAST FOURIER TRANSFORM," COMM. OF THE ACM, VOL 10, NO 10, OCTOBER 1967.
4. SYSTEM/360 SCIENTIFIC SUBROUTINE PACKAGE, IBM TECHNICAL PUBLICATIONS DEPT., 1967.

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED PART OF LANGUAGE

COS            FLOAT            SIN  
OTHERS  
FFT            - FAST FOURIER TRANSFORM OF A COMPLEX TAB FCN

## AUTHORS

WES RICE  
DUANE HARDER  
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VIM ROUTINE LASL C330A

DATE WRITTEN: 07/24/68

DATE(S) REVISED  
02/69 - DH

## LOCATION OF DECKS

SOURCE  
UPDATE LIBRARY ON TAPE LABELLED:    CLIBRARYUPD3.D=HY  
   (\*DECK LASC330)

OBJECT  
EDITLIB USER LIBRARY:    NSRDC

SUBROUTINE 'RFSN'

PURPOSE

INVERSE FAST FOURIER TRANSFORM

FUNCTIONAL CATEGORIES: E2

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

CALL RFSN (A, M, INV, S, IFERR)

DESCRIPTION OF PARAMETERS

- A - THE ARRAY CONTAINING THE REAL AND IMAGINARY FOURIER COEFFICIENT. A(1) AND A(2) CONTAIN, RESPECTIVELY, THE REAL AND IMAGINARY COMPONENTS, ETC.  $2^{*(M+1)+1}$  AND  $2^{*(M+1)+2}$  ARE THE FINAL FREQUENCY SUBSCRIPTS WHICH ARE USED IN THE SYNTHESIS. 'A' MUST BE DIMENSIONED AT LEAST  $2^{*(M+1)+4}$ .  
ON OUTPUT 'A' CONTAINS THE INVERSE FOURIER TRANSFORM.
- M - ONE LESS THAN THE SMALLEST INTEGER BASE 2 LOGARITHM THAT HAS AN ANTILOG WHICH WILL CONTAIN ALL THE ELEMENTS TO BE TRANSFORMED. FOR EXAMPLE, IF THE ARRAY TO BE TRANSFORMED CONTAINS 28 POINTS, M IS SET TO 4. THIS RESULT WOULD REQUIRE 17 PAIRS OF COEFFICIENTS.
- INV - SCRATCH ARRAY REQUIRING 1/8 THE DIMENSION OF 'A'
- S - SCRATCH ARRAY REQUIRING 1/8 THE DIMENSION OF 'A'
- IFERR - ERROR RETURN CODE
  - = 0 -- NORMAL COMPLETION
  - <>0 -- ERRORS IN SUBROUTINE ARGUMENTS

NOTE:  $3 < M < 20$ . ALL COEFFICIENTS MUST BE DEFINED;  
THEREFORE ALL  $2^{*(M+1)}$  REAL AND IMAGINARY COEFFICIENTS  
MUST BE SET TO APPROPRIATE VALUES.

CM REQUIRED: 307B



#### METHOD

THIS OPERATION MAKES USE OF THE SEPARABLE PROPERTIES OF THE FOURIER COEFFICIENTS OF THE REAL AND IMAGINARY COMPONENTS OF A COMPLEX VECTOR. THE ALGORITHM IS ACCOMPLISHED BY PERFORMING IN REVERSE ORDER THE INVERSE OF EACH STEP IN SUBROUTINE RFFT. THIS IS ALMOST A SPECIAL CASE OF THE DUAL USE OF THE COOLEY-TUKEY ALGORITHM DESCRIBED IN REFERENCE 2. ANOTHER SIMILAR TECHNIQUE IS DESCRIBED IN REFERENCE 3.

#### REFERENCES

1. COOLEY, J. W. AND TUKEY, J. W. "AN ALGORITHM FOR THE MACHINE CALCULATION OF COMPLEX FOURIER SERIES," MATH. COMPUT. VOL 19, NO 90 (APRIL 1965), 297-301.
2. GODFREY, M. D., BINGHAM, C., AND TUKEY, J. W., "MODERN TECHNIQUES OF POWER SPECTRUM ESTIMATION," IEEE TRANS. ON AUDIO AND ELECTROACOUSTICS (JUNE 1967), PP. 56-66.
3. SINGLETON, RICHARD C., "ON COMPUTING THE FAST FOURIER TRANSFORM," COMM. OF THE ACM, VOL 10, NO 10, OCTOBER 1967.
4. SYSTEM/360 SCIENTIFIC SUBROUTINE PACKAGE, IBM TECHNICAL PUBLICATIONS DEPT., 1967.

#### SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

COS SIN

OTHERS

FFT - FAST FOURIER TRANSFORM OF A COMPLEX TAB FCN

#### AUTHORS

WES RICE

DUANE HARDER

LOS ALAMOS SCIENTIFIC LABORATORY

VIM ROUTINE LASL C331A

DATE WRITTEN: 08/07/68

DATE(S) REVISED

02/69 - DH

#### LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED: CLIBRARYUPD3,D=HY  
(\*DECK LASC331)

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'RNDMIZ'

PURPOSE

EMULATE BASIC LANGUAGE 'RANDOMIZE' STATEMENT (CAN BE USED TO  
GUARANTEE FIRST CALL TO RANF WILL RESULT IN A DIFFERENT  
NUMBER WITH EACH EXECUTION OF A PROGRAM)

FUNCTIONAL CATEGORIES: V1

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

R = RNDMIZ (N)

DESCRIPTION OF PARAMETERS

N - DUMMY ARGUMENT - IGNORED  
RNDMIZ - WILL RETURN A RANDOM NUMBER SIMILAR TO THAT  
OBTAINED BY RANF

CM REQUIRED: 23B

METHOD

THE RANF SEED IS CHANGED USING THE CURRENT CP TIME  
(FRACTIONAL PART ONLY)

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

INT RANF SECOND

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/08/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'ROUTE'

## PURPOSE

CALLABLE ROUTE COMMAND

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: FORTRAN IV EXTENDED AND CDC 6000 COMPASS

## REMARKS

THE FILE TO BE ROUTED MUST BE ON A QUEUE DEVICE.

THE CALLING PROGRAM MUST CLOSE THE FILE BEFORE 'ROUTE' IS CALLED. AN FTM SEQUENTIAL FILE (WRITE, PRINT, PUNCH) MAY BE "CLOSED" BY ISSUING A 'REWIND N' BEFORE THE CALL TO 'ROUTE'. IF THE FILE IS NOT CLOSED, THE FINAL BUFFER MAY NOT BE ROUTED.

## USAGE

CALL ROUTE (IRC, IPRMS, NW)

CALL ROUTE (IRC, IPRMS)

## DESCRIPTION OF PARAMETERS

IRC - ERROR RETURN CODE

		NOS/BE-GENERATED	MEANING
DEC	OCT		
---	---	-----	-----
1	001	INVALID LFN - DSP	
2	002	CANNOT ROUTE NON-ALLOCATABLE EQUIPMENT	
3	003	CANNOT ROUTE PERMANENT FILE	
4	004	NO PERMISSION TO ROUTE THIS FILE	
5	005	ROUTE TO INPUT NOT IMMEDIATE - IGNORED	
6	006	IMMEDIATE ROUTING - NO FILE - IGNORED	
7	007	INVALID DISPOSITION CODE - ROUTING IGNORED	
8	010	INVALID FID - ROUTING IGNORED	
9	011	DSP ABORTED BY SYSTEM	
10	012	DSP PARAMETER OUTSIDE FL	
11	013	PRIORITY SPECIFICATION IGNORED	
12	014	E1200 SPECIFIED - INTERCOM USED (DSP)	
13	015	E1200 SPECIFIED - INTERCOM USED (DSP)	
14	016	CANNOT ROUTE INPUT FILE	
15	017	DSP COMPLETE BIT ALREADY SET	
16	020	FILE ON DISMOUNTABLE DEVICE - ROUTING IGNORED	
17	021	TID NOT ALPHANUMERIC - ROUTING IGNORED	
18	022	FORMS CODE NOT ALPHANUMERIC - ROUTING IGNORED	
19	023	INVALID LINK TYPE - ROUTING IGNORED (DSP)	
20	024	FILE NOT ON QUEUE DEVICE - ROUTING IGNORED	
21	025	PRE-DAYFILE LFN AND NO DC=IN - ROUTE IGNORED	
22	026	PRE-DAYFILE FILE NOT FOUND - ROUTE IGNORED	

IPRMS - PARAMETERS FOR ROUTE  
(UNUSED FIELDS MUST BE SET TO ZERO)

IPRMS	CONTENTS	FORMAT
1	LFN	1-7 CHAR, LEFT**
2	DC	0 FOR DEFAULT -OR- 2-CHAR DISPOSITION CODE, LEFT**
3	TID	0 -OR- 1LC - ROUTE TO CENTRAL SITE -OR- 3-CHAR TERMINAL ID, LEFT** -OR- 4LHERE - ROUTE TO THIS TERMINAL
4	FID	1-7 CHAR FILE ID -OR- 1L* -OR- 1-5 CHAR FILE ID, PRECEDED BY * (ALL LEFT** )
5	DEF	0 -OR- 3LDEF - TO DEFER ROUTING UNTIL END-OF-JOB
6		NON-ZERO TO RETURN THE JOB NAME IN THIS WORD
7	FC	0 -OR- 2-CHAR FORMS CODE, LEFT**
8	EC	0 - USE DEFAULT FOR PRINT: 2LB4, 2LB6, 2LA6, 2LA9 FOR PUNCH: 2LSB, 5L80COL, 3L026, 3L029, 5LASCII
9	IC	ONE OF: 0 OR 3LDIS - DISPLAY CODE 5LASCII - ASCII 3LBIN - BINARY
10	STID	3-CHAR STATION (SITE) ID, LEFT**
11	PRI	PRIORITY FOR INTERACTIVELY ROUTED OUTPUT FILE BEING ROUTED TO THE ROUTING TERMINAL - 1-4 DIGIT OCTAL VALUE (0000B-7777B) FOR ALL OTHER FILES - 0
12	REP	REPEAT COUNT (0-31 (37B))
13	NCD	0 -OR- 1 - NO COMPLEMENTARY DAYFILE (VALID ONLY IF IPRMS(5)=3LDEF)

\*\* LEFT=LEFT-JUSTIFIED. BLANK OR ZERO PADDED

NW - NUMBER OF LAST ELEMENT IN IPRMS (OPTIONAL)  
(IF OMITTED, NW=13)

CM REQUIRED: 347B

# EXAMPLES

- 1) ASSUME THE PROGRAM HAS WRITTEN FILE 'TAPE7' TO BE PRINTED AT CENTRAL SITE:

```

      ..
      INTEGER IPRMS(13)
      ..
      IPRMS(1) = 5LTAPE7
      IPRMS(2) = 2LPR
      IPRMS(3) = 1LC
      IPRMS(4) = 1L*
      ..
      REWIND 7
      CALL ROUTE (IRC, IPRMS, 4)
      ...

```

THIS WILL SIMULATE: ROUTE.TAPE7.DC=PR.TID=C.FID=\*

- 2) A PROGRAM WISHES TO PUNCH FILE 'PUNCH' AT REMOTE TERMINAL '011' AT END OF JOB:

```

      ..
      INTEGER IPRMS(13)
      ..
      IPRMS(1) = 5LPUNCH
      IPRMS(2) = 2LPU
      IPRMS(3) = 3L011
      IPRMS(4) = 1L*
      IPRMS(5) = 3LDEF
      IPRMS(6) = 1
      ..
      CALL ROUTE (IRC, IPRMS, 6)
      IF (IRC .EQ. 0) PRINT 1, IPRMS(6)
      1 FORMAT (" TAPE7 WILL BE PRINTED WITH JOB NAME " A7)
      ...

```

THIS WILL SIMULATE: ROUTE.PUNCH.DC=PU.TID=011.FID=\*.DEF.

- 3) A PROGRAM CREATES A 'JOB' ON FILE 'TAPE99' TO BE SUBMITTED TO THE SAME INPUT QUEUE AS THE CREATING JOB:

```

      ..
      INTEGER IPRMS(13)
      ..
      IPRMS(1) = 6LTAPE99
      IPRMS(2) = 2LIN
      IPRMS(3) = 4LHERE
      ..
      WRITE (99, 1)
      99 FORMAT ("JOB CARD" / "CHARGE CARD" / "....")
      REWIND 99
      CALL ROUTE (IRC, IPRMS, 3)

```

THIS WILL SIMULATE: ROUTE.TAPE99.DC=IN.TID.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND            LOCF            MAX0            MIN0            MOVLEV  
OR            SHIFT

OTHERS

BZFILL - CHANGE BLANKS TO 00B  
HERE - GET TERMINAL IS FOR THIS JOB  
HEX3 - CONVERT 3-DIGIT HEX TO 2-CHAR  
TRAILBZ - CHANGE TRAILING BLANKS TO 00B  
ZSYSEQ - CALL THE SYSTEM

ARITHMETIC STATEMENT FUNCTIONS

FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)  
L11FMT    L21FMT    L31FMT    L52FMT    L71FMT  
FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)  
R18FMT    R21FMT

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/08/75

DATE(S) REVISED

01/24/77 - ADD REP PARAMETER, CHANGE PRI DESCRIPTION  
11/30/77 - ADD NCD PARAMETER  
10/01/78 - CHANGE TO 3-CHARACTER TID

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY:    NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY:    NSRDC

SUBROUTINE 'ROUTERC'

PURPOSE

SUPPLY DESCRIPTION OF ROUTE RETURN CODE

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

THE DESCRIPTIONS ARE THOSE FOUND IN THE "NDS/BE VERSION 1  
REFERENCE MANUAL" (60493800 H) ON PAGE 7-82.

USAGE

CALL ROUTERC (IRC, A)

DESCRIPTION OF PARAMETERS

IRC - RETURN CODE FROM SUBROUTINE 'ROUTE'

A - 5-WORD ARRAY WHICH WILL CONTAIN THE DESCRIPTION OF THE  
SUPPLIED 'IRC'  
(IF 'IRC' IS INVALID, 'UNKNOWN RETURN CODE' IS  
RETURNED)

CM REQUIRED: 625B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

NONE

OTHERS

MOVEIT - MOVE AN ARRAY

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 12/15/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'SBYT'  
FUNCTION 'SBYT'

PURPOSE  
STORE VARIABLE LENGTH BYTE

FUNCTIONAL CATEGORIES: M4

USAGE  
CALL SBYT (N, LENGTH, INTO, FROM)  
-OR-  
VARIABLE = SBYT (N, LENGTH, INTO, FROM)

DESCRIPTION OF PARAMETERS  
N - BEGINNING BIT POSITION IN WORD <INTO> WHERE THE  
BYTE WILL BE PLACED. BITS ARE NUMBERED FROM 1 TO  
60 FROM RIGHT TO LEFT.  
LENGTH - LENGTH OF THE BYTE IN BITS. THIS LENGTH STARTS  
WITH THE RIGHTMOST BIT OF <FROM>.  
INTO - WORD INTO WHICH THE BYTE WILL BE PLACED.  
FROM - WORD FROM WHICH THE BYTE WILL BE TAKEN FROM THE  
LOW ORDER BITS.

NOTE: IN THE SECOND FORM, <VARIABLE> AND <INTO> WILL  
CONTAIN THE SAME VALUE. THUS, THEY MAY HAVE THE  
SAME VARIABLE NAME.

NOTE: BITS 1 THRU <LENGTH> OF WORD <FROM> ARE PLACED INTO  
BITS <N> THRU (N+LENGTH-1) OF <INTO>.

REMARKS  
STORES A 1 TO 60-BIT BYTE FROM ONE WORD INTO ANY POSITION IN  
A SECOND WORD WITHOUT DISTURBING THE REMAINING PART OF THAT  
WORD.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
NONE

EXAMPLE  
I = 7777 1111 2222 5555 4444B  
J = 3333 2222 1111 5555 4436B  
AA = SBYT (37, 6, I, J)

RESULTS IN  
AA = 7777 1136 2222 5555 4444B  
I = 7777 1136 2222 5555 4444B

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 20B

AUTHOR: FROM CDC KRONOS SYSTEM

DATE WRITTEN:

LOCATION OF DECKS  
SOURCE: UPDATE LIBRARY: NSRDCPL.ID=CSYS  
OBJECT: EDITLIB USER LIBRARY: NSRDC



SUBROUTINE 'SEMICO'

PURPOSE

REPLACE DISPLAY CODE 00B WITH 77B (SEMI-COLON)

FUNCTIONAL CATEGORIES: M4

USAGE

CALL SEMICO (IA, I)

DESCRIPTION OF PARAMETERS

IA - (ARRAY) TO BE PROCESSED

I - NUMBER OF WORDS IN 'IA' TO BE PROCESSED

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 37B

AUTHOR

? - NWL

DATE WRITTEN: ?

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'SETREW'

## PURPOSE

CONVERT REWIND OPTION INTO RM OPEN AND CLOSE CODES

FUNCTIONAL CATEGORIES: M4

## USAGE

CALL SETREW (REW, OPEN, CLOSE, NOE)  
CALL SETREW (REW, OPEN, CLOSE)

## DESCRIPTION OF PARAMETERS

REW - INPUT REWIND OPTION. ONE OF:  
A - OPEN=NOREWIND; CLOSE=REWIND  
B - OPEN=REWIND ; CLOSE=NOREWIND  
E - OPEN=POSITION BEFORE END-OF-INFORMATION;  
CLOSE=NOREWIND  
EN - OPEN=POSITION BEFORE EOI; CLOSE=NOREWIND  
ER - OPEN=POSITION BEFORE EOI; CLOSE=REWIND  
EU - OPEN=POSITION BEFORE EOI; CLOSE=UNLOAD  
R - OPEN=REWIND ; CLOSE=REWIND  
U - OPEN=REWIND ; CLOSE=REWIND AND UNLOAD  
OTHER - OPEN=NOREWIND; CLOSE=NOREWIND  
(ANY WORDS BEGINNING WITH THESE LETTERS WILL  
PRODUCE THE SAME RESULTS. ONLY THE FIRST 1  
OR 2 LETTERS ARE RETURNED IN L-FORMAT)  
OPEN - WILL CONTAIN OPEN REWIND OPTION (1LE, 1LN, 1LR)  
CLOSE - WILL CONTAIN CLOSE REWIND OPTION (1LN, 1LR, 1LU)  
NOE - OMITTED OR 0 - ALLOW ALL VALUES OF REW  
OTHER - DO NOT ALLOW 'E' VALUES OF REW

## REMARKS

NONE

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF

OTHERS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 113B

## AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/29/75

## DATE(S) REVISED

01/29/76

01/11/76 - ADD 'NOE' PARAMETER

## LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'SHIFTA'

PURPOSE

SHIFT WHOLE ARRAY SPECIFIED NUMBER OF BITS (CROSSING OVER  
WORD BOUNDARIES)

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

SEE 'AShift' FOR SHIFTING INDIVIDUAL WORDS OF AN ARRAY.

USAGE

CALL SHIFTA (A, B, N, NBITS)

DESCRIPTION OF PARAMETERS

A - INPUT ARRAY OF DIMENSION 'N'  
B - OUTPUT ARRAY OF DIMENSION 'N+1'  
(MAY NOT BE SAME AS 'A')  
N - NUMBER OF WORDS TO BE PROCESSED  
NBITS - NUMBER OF BITS TO SHIFT  
    <0 - SHIFT TO LEFT  
        (LEFTMOST BITS LOST, TRAILING BITS SET TO 0,  
        B(N+1) NOT DEFINED)  
    =0 - JUST MOVE (B(N+1) IS SET TO 0)  
    >0 - SHIFT TO RIGHT  
        (LEADING AND TRAILING BITS SET TO 0)

CM REQUIRED: 116B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

SHIFT

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 04/26/74

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'SIMPUN'

PURPOSE

SIMPSON'S RULE INTEGRATION - EQUAL OR UNEQUAL INTERVALS

FUNCTIONAL CATEGORIES: D1

LANGUAGE: FORTRAN IV

REMARKS

NONE

USAGE

VALUE = SIMPUN (X, Y, N)

DESCRIPTION OF PARAMETERS

X - ARRAY OF MONOTONE X-VALUES

Y - ARRAY OR CORRESPONDING Y-VALUES

N - NUMBER OF VALUES

CM REQUIRED: 102B

ERROR MESSAGE

L=XXXXX, X=X.XXXXXXX E+YY, X NOT MONOTONE STOP  
SELF-EXPLANATORY

METHOD

THE INTEGRAL FROM X1 TO XN OF YDX IS EVALUATED BY FITTING  
PARABOLAS TO SUCCESSIVE INTERVALS AND INTEGRATING OVER  
THE INTERVALS.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHORS

WERNER FRANK

SHARON E GOOD - DTNSRDC CODE 1892.1

DATE WRITTEN:

DATE(S) REVISED

06/29/58 - SEG

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY ON TAPE LABELLED: CLIBRARYUPD3  
(\*DECK AMSIUF)

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'SKWEZL'

PURPOSE

SQUEEZE LEFT AND REMOVE BLANKS AND OOB

FUNCTIONAL CATEGORIES: M4

USAGE

CALL SKWEZL (A, NA, NC, NW)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE SQUEEZED  
(WILL BE REPLACED BY SQUEEZED ARRAY)  
NA - NUMBER OF WORDS TO BE SQUEEZED  
NC - OUTPUT NUMBER OF CHARACTERS IN SQUEEZED ARRAY  
NW - OUTPUT NUMBER OF WORDS IN SQUEEZED ARRAY

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

GETCHA - EXTRACT CHARACTER FROM ARRAY  
PUTCHA - PUT CHARACTER INTO ARRAY

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 111B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/19/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'SKWEZR'

PURPOSE

SQUEEZE RIGHT AND REMOVE BLANKS AND OOB

FUNCTIONAL CATEGORIES: M4

USAGE

CALL SKWEZR (A, NA, NC, NW)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE SQUEEZED  
(WILL BE REPLACED BY SQUEEZED ARRAY)  
NA - NUMBER OF WORDS TO BE SQUEEZED  
NC - OUTPUT POSITION OF FIRST NON-ZERO CHARACTERS IN  
SQUEEZED ARRAY (POSITION 1 IS LEFTMOST CHARACTER IN  
A(1))  
NW - OUTPUT SUBSCRIPT OF FIRST NON-ZERO WORD

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

GETCHA - EXTRACT CHARACTER FROM ARRAY  
PUTCHA - PUT CHARACTER INTO ARRAY

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 115B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/19/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'SNCNDN'

PURPOSE

EVALUATE THE THREE JACOBIAN ELLIPTIC FUNCTIONS

FUNCTIONAL CATEGORIES: C3

LANGUAGE: FORTRAN IV

REMARKS

IF CM=0 AND ABS(X) > (2K/PI)\*6.87E10, WHERE K IS THE QUARTER PERIOD OF SN, THE ERROR MESSAGE  
SNCNDN ARGUMENT X TOO LARGE. X=  
IS PRINTED ON FILE 'OUTPUT'.

USAGE

CALL SNCNDN (X, CM, SN, CN, DN)

DESCRIPTION OF PARAMETERS

X - INPUT PARAMETER  
CM - INPUT PARAMETER  
SN - OUTPUT PARAMETER - WILL CONTAIN THE VALUE OF SN(X,K)  
CN - OUTPUT PARAMETER - WILL CONTAIN THE VALUE OF CN(X,K)  
DN - OUTPUT PARAMETER - WILL CONTAIN THE VALUE OF DN(X,K)

CM REQUIRED: 310B

OUTPUT UNITS

UNIT #	LFN	USE
-----	-----	-----
	OUTPUT	ERROR MESSAGE (SEE REMARKS)

METHOD

GAUSS TRANSFORMATION

REFERENCE

BULIRSCH, R, "NUMERICAL CALCULATIONS OF ELLIPTIC INTEGRALS AND ELLIPTIC FUNCTIONS", NUMERISCHE MATHEMATIK, 7, 1965, PP. 78-90

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE	ABS	EXP	SIGN	SIN	SQRT
OTHERS					
NONE					

AUTHOR

R BULIRSCH

DATE WRITTEN: 01/68

DATE(S) REVISED

LOCATION OF DECKS

SOURCE  
CODE 1892.1  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'SSORT'

PURPOSE

FTN-CALLABLE SHELL SORT FOR REAL ARRAYS

FUNCTIONAL CATEGORIES: M1

USAGE

CALL SSORT (A, I, T)  
CALL SSORT (A, I)

DESCRIPTION OF PARAMETERS

A - REAL ARRAY TO BE SORTED  
I - NUMBER OF ELEMENTS TO BE SORTED  
T - IF PRESENT, AN ASSOCIATED ARRAY RE-ORDERED TO MAINTAIN  
1 TO 1 CORRESPONDENCE WITH THE ELEMENTS OF ARRAY 'A'

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF

SHIFT

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 116B

AUTHOR

C FLINK - KPS NWL

DATE WRITTEN: 12/07/70

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC



SUBROUTINE 'SSORTF'

PURPOSE

FTN-CALLABLE SHELL SORT FOR TWO-DIMENSIONAL REAL ARRAYS

FUNCTIONAL CATEGORIES: M1

LANGUAGE: FORTRAN IV

REMARKS

THIS ROUTINE IS INEFFICIENT IF M .GT. 10.

USAGE

CALL SSORTF (A, TEMP, M, N, I)  
CALL SSORTF (A, TEMP, M, N)

DESCRIPTION OF PARAMETERS

A - REAL ARRAY TO BE SORTED  
TEMP - TEMPORARY ARRAY OF DIMENSION M USED IN THE SORT  
M - NUMBER OF WORDS PER ITEM  
N - NUMBER OF ITEMS PER ARRAY  
(DIMENSION OF A IS A(M,N))  
I - IF PRESENT, NUMBER FROM 1 TO M SPECIFYING ON WHICH  
WORD OF AN ITEM TO SORT.  
IF OMITTED, I=1.

CM REQUIRED: 117B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE  
LOCF        SHIFT  
OTHERS  
MOVECM - MOVE AN ARRAY

AUTHOR

C FLINK - KPS NWL

DATE WRITTEN: 01/10/71

DATE(S) REVISED

11/23/76 - DVS - DTNSRDC - CHANGE SUBROUTINE SENT TO MOVLEV  
02/21/80 - DVS - DTNSRDC - CHANGE MOVLEV TO MOVECM

LOCATION OF DECKS

SOURCE  
UPDATE LIBRARY: NSRDCPL, ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'SSORTI'

PURPOSE

FTN-CALLABLE SHELL SORT FOR TWO-DIMENSIONAL INTEGER ARRAYS

FUNCTIONAL CATEGORIES: M1

USAGE

CALL SSORTI (A, TEMP, M, N, I)  
CALL SSORTI (A, TEMP, M, N)

DESCRIPTION OF PARAMETERS

A - INTEGER ARRAY TO BE SORTED  
TEMP - TEMPORARY ARRAY OF DIMENSION M USED IN THE SORT  
M - NUMBER OF WORDS PER ITEM  
N - NUMBER OF ITEMS PER ARRAY  
(DIMENSION OF A IS A(M,N))  
I - IF PRESENT, NUMBER FROM 1 TO M SPECIFYING ON WHICH  
WORD OF AN ITEM THE ARRAY IS TO BE SORTED.  
IF ABSENT, THE ARRAY WILL BE SORTED ON THE FIRST  
WORD (I=1).

REMARKS

THIS ROUTINE IS INEFFICIENT IF M .GT. 10.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOC - SHIFT

OTHERS

MOVECM - MOVE AN ARRAY

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 141B

AUTHOR

C FLINK - KPS NWL

ALBAN P GASS - NWL

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 01/10/71

DATE(S) REVISED

03/10/74 - APG - CHANGE FROM REAL TO INTEGER

06/09/76 - DVS - CHANGE SUBROUTINE SENT TO MOVLEV

02/21/80 - DVS - CHANGE SUBROUTINE MOVLEV TO MOVECM

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'SSORTL'

PURPOSE

FTN-CALLABLE LOGICAL SHELL SORT FOR CHARACTER ARRAYS

FUNCTIONAL CATEGORIES: M1

USAGE

CALL SSORTL (A, I, M, T)

CALL SSORTL (A, I, M)

DESCRIPTION OF PARAMETERS

A - CHARACTER ARRAY TO BE SORTED

I - NUMBER OF ELEMENTS IN ARRAY 'A' TO BE SORTED

M - MASK WORD WITH THE RELEVANT BITS SET

T - IF PRESENT, ASSOCIATED ARRAY, RE-ORDERED SUCH THAT  
A(K) STILL RELATES TO T(K)

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF

SHIFT

OTHERS

EQU60

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 114B

AUTHOR

C FLINK - KPS NWL

DATE WRITTEN: 12/03/70

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'SUMIT'

PURPOSE

SUM ELEMENTS OF REAL ARRAY

FUNCTIONAL CATEGORIES: A1

LANGUAGE: FORTRAN IV

REMARKS

NONE

USAGE

ITOTAL = SUMIT (ARRAY, N)

DESCRIPTION OF PARAMETERS

SUMIT - WILL CONTAIN  $ARRAY(1)+ARRAY(2)+\dots+ARRAY(N)$

ARRAY - ARRAY TO BE SUMMED

N - NUMBER OF ELEMENTS OF ARRAY TO BE SUMMED

CM REQUIRED: 16B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/23/76

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'SWAP'

PURPOSE

SWAP TWO ARRAYS

FUNCTIONAL CATEGORIES: K2

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS

CDC 6000

BURROUGHS B7700

REMARKS

NONE

USAGE

CALL SWAP (A, B, NWORDS)

DESCRIPTION OF PARAMETERS

A,B - ARRAYS TO BE SWAPPED (REAL OR INTEGER ON B7700)

NWORDS - NUMBER OF WORDS TO BE SWAPPED

CM REQUIRED: B7700: 136 WORDS

CDC : 16B WORDS

EXAMPLE

```
PROGRAM TEST (OUTPUT=128)
INTEGER A(10), B(10)
DATA A/ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10/
DATA B/ 10, 9, 8, 7, 6, 5, 4, 3, 2, 1/
...
CALL SWAP (A, B, 10)
C   ARRAY A NOW CONTAINS 10, 9, 8, 7, 6, 5, 4, 3, 2, 1
C   ARRAY B NOW CONTAINS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
...
```

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 11/12/80

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'TIMLEFT'

PURPOSE

DETERMINE CP (AND IO) TIME LEFT SINCE START OF BATCH JOB  
OR INTERCOM COMMAND

FUNCTIONAL CATEGORIES: Q0

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

CALL TIMLEFT (CP, XIO)  
CALL TIMLEFT (CP)

DESCRIPTION OF PARAMETERS

CP - WILL CONTAIN CP TIME REMAINING  
XIO - IF PRESENT, WILL CONTAIN IO TIME REMAINING  
(IF NEGATIVE, THE SYSTEM IS NOT TESTING IO TIME.  
THE TOTAL IO TIME USED IS ABS(XIO).)

CM REQUIRED: 65B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND FLOAT SHIFT

OTHERS

RCPA - READ CONTROL POINT AREA

ARITHMETIC STATEMENT FUNCTIONS

R65FMT - FAST R-FORMAT DECODE (RIGHT-ADJ, ZERO-FILLED)

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/27/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'TRAILBZ'

## PURPOSE

CHANGE TRAILING BLANKS TO ZEROS (00B)

FUNCTIONAL CATEGORIES: M4

## USAGE

CALL TRAILBZ (A, N)  
CALL TRAILBZ (A, N, NW)  
CALL TRAILBZ (A, N, NW, NC)

## DESCRIPTION OF PARAMETERS

A - ARRAY TO BE PROCESSED  
N - NUMBER OF WORDS OF 'A' TO BE PROCESSED  
NW - NUMBER OF LAST NON-BLANK WORD OF 'A'  
(0 LE NW LE N)  
(NW=0 MEANS ALL OF 'A' IS BLANK)  
NC - POSITION OF LAST NON-BLANK CHARACTER OF A(NW)  
(0 LE NC LE 10)  
(NC=0 MEANS ALL OF 'A' IS BLANK)

## REMARKS

00B IS TREATED AS A BLANK.

THIS SUBROUTINE IS USEFUL WHEN GENERATING MESSAGES FOR PRINTING IN THE DAYFILE USING 'CALL REMARK'. AFTER A MESSAGE IS GENERATED WITH AN ENCODE, A CALL TO 'TRAILBZ' WILL REMOVE ANY TRAILING BLANKS. THIS WILL RESULT IN THE SHORTEST POSSIBLE MESSAGE. THIS IS PARTICULARLY DESIRABLE FOR PROGRAMS WHICH ARE RUN FROM TELETYPE, SINCE TRAILING BLANKS ARE NOT SUPPRESSED FOR DAYFILE MESSAGES.

## SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

LOCF  
MASK  
SHIFT

## ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 122B

## AUTHOR

DAVID V SOMMER - NSRDC CODE 1892.2

DATE WRITTEN: 04/08/75

DATE(S) REVISED

## LOCATION OF DECKS

SOURCE

TAPE LABELLED CSYSNSRDCPL: P.F. NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

08/22/77

2-212

TRAILBZ - 1 OF 1

FUNCTION 'UNHEX3'

PURPOSE

SPREAD 2 CHARACTERS INTO 3 HEX DIGITS

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

'UNHEX3' IS AN INTEGER FUNCTION.

WRITTEN TO CHANGE 2-CHARACTER INTERNAL TERMINAL ID INTO  
3-CHARACTER (HEX) TERMINAL ID

USAGE

I = UNHEX3 (INTTID)

DESCRIPTION OF PARAMETERS

INTTID - INPUT INTERNAL TID (E.G., 2L@D)

UNHEX3 - OUTPUT IN FIRST 3 CHARACTERS (E.G., 3LF04)

CM REQUIRED: 43B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND

OR

SHIFT

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 09/19/78

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC



SUBROUTINE 'UNLOAD'

PURPOSE

UNLOAD A FORTRAN FILE

FUNCTIONAL CATEGORIES: Q3

USAGE

CALL UNLOAD (IUNIT)

DESCRIPTION OF PARAMETER

IUNIT - FORTRAN LOGICAL UNIT NUMBER

REMARKS

THE FILE TO BE UNLOADED MUST BE LISTED IN THE FORTRAN  
PROGRAM STATEMENT. FOR NON-STANDARD FILES, SEE 'CLUNLD'.

FORTRAN SEQUENTIAL FILES SHOULD HAVE THEIR BUFFERS FLUSHED  
BY ISSUING A REWIND BEFORE CALLING THIS ROUTINE.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

CLUXXX - UNLOAD A FILE

LANGUAGE: FORTRAN IV EXTENDED

CM REQUIRED: 21B

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 03/07/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

FUNCTION 'VALDAT'

PURPOSE

LOGICAL FUNCTION TO VALIDATE A DATE FORMAT

FUNCTIONAL CATEGORIES: M4

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

'VALDAT' MUST BE DECLARED LOGICAL IN THE CALLING PROGRAM.

UPON RETURN, IF THE FORMAT WAS VALID, THE DATE IS RETURNED  
AS ' MM/DD/YY '.

USAGE

VALDAT (DATE)

DESCRIPTION OF PARAMETERS

DATE - DATE TO BE ANALYZED

(IF FORMAT OK, RETURNED AS ' MM/DD/YY ')

VALDAT - WILL CONTAIN

.TRUE. - DATE FORMAT WAS OK

.FALSE. - DATE FORMAT WAS NOT OK

CM REQUIRED: 162B

METHOD

DATE FORMAT IS VALIDATED BY THE FOLLOWING CHECKS:

EXACTLY 2 SLASHES

SLASHES SEPARATED BY 1 OR 2 CHARACTERS

SLASHES NOT IN POSITIONS 1, 9 OR 10

MONTH CONTAINS 1 OR 2 DIGITS (LEADING BLANKS OK)

DAY CONTAINS 1 OR 2 DIGITS (LEADING BLANKS OK)

YEAR CONTAINS 2 DIGITS

VALDAT RETURNS IF ANY CHECK FAILS.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND OR SHIFT

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 07/26/77

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'VALIDT'

PURPOSE

VALIDATE ARRAY 'A' TO SEE THAT EACH ELEMENT IS ONE OF THOSE  
OF ARRAY 'V'

FUNCTIONAL CATEGORIES: M5

LANGUAGE: FORTRAN IV EXTENDED

REMARKS

NONE

USAGE

CALL VALIDT (A, NA, V, NV, VALID)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE VALIDATED  
NA - NUMBER OF ELEMENTS OF 'A' TO BE TESTED  
V - ARRAY OF VALID ELEMENTS  
NV - NUMBER OF ELEMENTS IN 'V'  
VALID - LOGICAL OUTPUT CODE  
TRUE - ALL ELEMENTS OF 'A' ARE VALID  
FALSE - AT LEAST 1 ELEMENT OF 'A' IS INVALID

CM REQUIRED: 54B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHOR

DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 10/72

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'VFILL'

PURPOSE

FILL AN ARRAY WITH USER-SPECIFIED WORD

FUNCTIONAL CATEGORIES: M4

LANGUAGE: CDC 6000 COMPASS  
B7700 FORTRAN IV

COMPUTERS: BURROUGHS B7700  
CDC 6000

REMARKS

NONE

USAGE

CALL VFILL (WORD, A, NA)

DESCRIPTION OF PARAMETERS

WORD - WORD TO BE PUT INTO ARRAY 'A'

A - ARRAY TO RECEIVE 'WORD'

NA - NUMBER OF WORDS IN 'A' TO BE SET TO 'WORD'

CM REQUIRED: ?B

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE

NONE

OTHERS

NONE

AUTHOR

C FLINK - KPS NWL

DATE WRITTEN: 02/10/71

DATE(S) REVISED

??/??/74 - DAVID V SOMMER - DTNSRDC CODE 1892.2  
(NAME CHANGED FROM 'MOVE' TO 'VFILL')

05/01/79 - MOVE TO BURROUGHS B7700  
(CHANGE TO FORTRAN - DVS)

LOCATION OF DECKS

SOURCE

B7700: \*SOURCE/NSRDC/VFILL

CDC : UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

B7700: \*NSRDC/VFILL

CDC : EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'WARNING'

PURPOSE

FTN-CALLABLE 'WARNING' CONTROL CARD

FUNCTIONAL CATEGORIES: 01

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS

CDC 6000

REMARKS

NONE

USAGE

CALL WARNING (BANNER, OUTFILE)

DESCRIPTION OF PARAMETERS

BANNER - BANNER REQUEST. ONE OF:  
"FOUO" - FOR OFFICIAL  
USE ONLY  
"OFFICIAL" - FOR OFFICIAL  
USE ONLY  
"PRIVACY" - PERSONAL DATA  
PRIVACY ACT  
OF 1974  
"CONFIDENTIAL" - CONFIDENTIAL  
"SECRET" - SECRET

NOTE: ONLY THE FIRST 7 CHARACTERS ARE TESTED.

OUTFILE - FORTRAN LOGICAL UNIT NUMBER OF THE OUTPUT FILE

CM REQUIRED: 1735B

OUTPUT DESCRIPTION

ONE BANNER PAGE WITH THE REQUESTED BANNER.

OUTPUT UNITS

UNIT #	LFN	USE
-----	-----	-----
USER SPECIFIES		LISTABLE OUTPUT

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
AND  
OTHERS  
NONE

ARITHMETIC STATEMENT FUNCTIONS  
L71FMT - FAST L-FORMAT DECODE (LEFT-ADJ, ZERO-FILLED)

AUTHOR  
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATE WRITTEN: 09/19/79

DATE(S) REVISED

LOCATION OF DECKS  
SOURCE  
UPDATE LIBRARY: NSRDCPL, ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'WEKDAY'

PURPOSE

DETERMINE THE DAY OF THE WEEK FOR ANY GREGORIAN DATE FROM  
OCTOBER 15, 1582 THRU FEBRUARY 28, 4000

FUNCTIONAL CATEGORIES: M2

LANGUAGE: FORTRAN IV

COMPUTERS: BURROUGHS B7700. CDC 6000

REMARKS

DATES FROM JANUARY 1, 1582 THRU OCTOBER 14, 1582 AND  
AFTER FEBRUARY 28, 4000 THRU DECEMBER 31, 4000 ARE NOT  
VALIDATED.

USAGE

CALL WEKDAY (IERR, IDAY, IGY, IGM, IGD)

DESCRIPTION OF PARAMETERS

IERR - RETURN CODE  
0 - NO ERROR  
1 - AT LEAST ONE OF IGY, IGM, IGD OUT OF RANGE  
IDAY - WILL CONTAIN DAY-OF-WEEK  
0 (SUNDAY) THRU 6 (SATURDAY)  
IGY - GREGORIAN YEAR (EG, 1975)  
IGM - GREGORIAN MONTH (1-12)  
IGD - GREGORIAN DAY (1-31)

CM REQUIRED: EST 123 WORDS (B7700); 102B (CDC)

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

MOD

OTHERS

NONE

METHOD

SEE IBM PROGRAM DESCRIPTION 360D 03.1.004

AUTHOR

RICHARD CONNER - IBM

DATE WRITTEN: 10/15/66

DATE(S) REVISED

04/26/73 - REWRITTEN IN FORTRAN FOR CDC 6000 - DVS

04/25/79 - IMPLEMENTED ON BURROUGHS B7700 - DVS

LOCATION OF DECKS

SOURCE

B7700: \*SOURCE/NSRDC/WEKDAY

CDC : UPDATE LIBRARY: NSRDCPL.UD=CSYS

OBJECT

B7700: \*NSRDC/WEKDAY

CDC : EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'ZBLANK'

PURPOSE

CHANGE BLANKS TO 00B AND VICE VERSA

FUNCTIONAL CATEGORIES: M4

USAGE

CALL ZBLANK (A, NA)

DESCRIPTION OF PARAMETERS

A - START OF AREA TO BE PROCESSED

NA - NUMBER OF WORDS TO BE PROCESSED

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

AND

OTHERS

NONE

ARITHMETIC STATEMENT FUNCTIONS

NONE

LANGUAGE: FORTRAN IV

CM REQUIRED: 46B

AUTHOR

J. P. - KPS - NWL

DATE WRITTEN: 1973

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL, ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC



SUBROUTINE 'ZEROFL'

PURPOSE

ZERO FIELD LENGTH (SECURITY EOJ)

FUNCTIONAL CATEGORIES: M4

USAGE

CALL ZEROFL

REMARKS

'ZEROFL' ZEROS THE JOB'S FIELD LENGTH ABOVE 77B AND ENDS  
THE JOB WITHOUT DAYFILE MESSAGES.

THE INTENDED USE IS AS THE TERMINATION ROUTINE, CALLED BY  
REPRIEVE, WHENEVER A UTILITY PROGRAM HAS WITHIN ITS FIELD  
LENGTH DATA THAT SHOULD NOT APPEAR IN A USER'S DUMP.

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 21B

AUTHOR

C FLINK - KP NWL

DATE WRITTEN: 08/73

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'ZEROS'  
SUBROUTINE 'ZEROES'

PURPOSE

REPLACE BLANKS WITH (DISPLAY CODE) ZEROS, MULTIPLE FIELDS

FUNCTIONAL CATEGORIES: M4

USAGE

CALL ZEROS (A, S1, L1, S2, L2, ..., SN, LN)  
CALL ZEROES (A, S1, L1, S2, L2, ..., SN, LN)

DESCRIPTION OF PARAMETERS

A - ARRAY TO BE PROCESSED

S - STARTING BYTE OF A FIELD

(BYTE COUNT BEGINS WITH 1 FOR THE LEFTMOST BYTE IN 'A')

L - NUMBER OF BYTES IN THIS FIELD TO PROCESS

(UP TO 31 PAIRS OF SI,LI)

REMARKS

'ZEROS' WILL REPLACE BLANKS WITH ZEROS UP TO THE 1ST  
NON-BLANK CHARACTER IN A GIVEN FIELD.

IF THE 1ST NON-BLANK CHARACTER IS MINUS (-), THEN THAT  
CHARACTER POSITION IS REPLACES WITH A ZERO AND THE 1ST  
CHARACTER IN THE FIELD IS REPACED WITH A MINUS (-).

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

NONE

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 55B

AUTHOR

T HERRING - KPS NWL

DATE WRITTEN: 12/09/70

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL.ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

# SUBROUTINE 'ZPFPUT'

## PURPOSE

PUT USER-SPECIFIED PARAMETERS INTO ARRAY FOR LATER CALL TO ZPFUNC

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: FORTRAN IV EXTENDED

## COMPUTERS

CDC 6000

## USAGE

```
CALL ZPFPUT (IPRMS, NW)
CALL ZPFPUT (IPRMS, NW, LFN, PFN, ID, TK, RD, EX, MD, CN,
             MR, AC, CY, RP, XR, LC, RW, SN, VSN, FO, ST,
             UV, RB)
```

### FOR EXAMPLE:

```
CALL ZPFPUT (IPRMS, 0)
CALL ZPFPUT (IPRMS, 1, LFN)
CALL ZPFPUT (IPRMS, 5, LFN, PFN)
CALL ZPFPUT (IPRMS, 6, LFN, PFN, ID)

CALL ZPFPUT (IPRMS, 13, LFN, PFN, ID, TK, RD, EX, MD, CN,
             MR, AC)

CALL ZPFPUT (IPRMS, 24, LFN, PFN, ID, TK, RD, EX, MD, CN,
             MR, AC, CY, RP, XR, LC, RW, SN, VSN, FO, ST,
             UV, RB)
```

## DESCRIPTION OF PARAMETERS

IPRMS - ARRAY (MAXIMUM REQUIRED DIMENSION 24) TO BE  
DEFINED

NW - 0 - SET ALL 24 WORDS TO ZERO  
1 THRU 24 - DEFINE NW PARAMETERS FROM THE  
FOLLOWING

LFN - LOCAL FILE NAME (1-7 CHARACTERS)

PFN - 4-WORD PERMANENT FILE NAME

ID - 1-9 CHARACTERS

TK - TURNKEY PASSWORD (1-9 CHARACTERS)

RD - READ PASSWORD (1-9 CHARACTERS)

EX - EXTEND PASSWORD (1-9 CHARACTERS)

MD - MODIFY PASSWORD (1-9 CHARACTERS)

CN - CONTROL PASSWORD (1-9 CHARACTERS)

MR - MULTIPLE-READ (0 OR NOT)  
 AC - ACCOUNT NUMBER (10 CHARACTERS, LAST IS NUMERIC)  
 CY - CYCLE (INTEGER -999 TO -1, 1 TO 999)  
 RP - RETENTION PERIOD (0-999)  
 XR - READ-ONLY PASSWORD (1-9 CHARACTERS)  
 LC - LOWEST CYCLE (0 OR NOT)  
 RW - MULTI-READ, SINGLE WRITE (0 OR NOT)  
 SN - SETNAME (1-7 CHARACTERS)  
 VSN - VOLUME SERIAL NUMBER (1-6 CHARACTERS,  
 LEFT-JUSTIFIED). RESERVED FOR FUTURE.  
 FO - FILE ORGANIZATION (2-CHARACTERS)  
 ST - STATION ID (MULTI-FRAME)  
 RESERVED FOR FUTURE.  
 UV - UNIVERSAL PASSWORD (1-9 CHARACTERS)  
 RB - PURGE RB CONFLICTS (0 OR NOT)

NOTE: ALL VARIABLES ARE TYPE INTEGER. CHARACTER DATA IS  
 LEFT-JUSTIFIED AND MAY BE ZERO- OR BLANK-PADDED.  
 TO CLEAR (OR OMIT) A SPECIFIC PARAMETER, USE 0.

CM REQUIRED: 144B

REMARKS  
 NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
 PART OF LANGUAGE  
 MINO  
 OTHERS  
 NONE

AUTHOR  
 DAVID V SOMMER - DTNSRDC CODE 1892.2

DATA WRITTEN: 01/13/76

DATE(S) REVISED  
 01/20/76  
 09/23/80 - UPGRADE TO LEVEL 508 (UV AND RB ADDED)

LOCATION OF DECKS  
 SOURCE  
 UPDATE LIBRARY: NSRDCPL,ID=CSYS  
 OBJECT  
 EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'ZPFUNC'

PURPOSE

CALLABLE PERMANENT FILE FUNCTIONS

FUNCTIONAL CATEGORIES: Q3

LANGUAGE: FORTRAN IV EXTENDED

COMPUTERS

CDC 6000

USAGE

CALL ZPFUNC (IRC, IPRMS, NW)

DESCRIPTION OF PARAMETERS

IRC - INPUT: PERMANENT FILE FUNCTION DESIRED

- 1 - ATTACH (10B)
- 2 - CATALOG (20B)
- 3 - EXTEND (30B)
- 4 - PURGE (40B)
- 5 - RENAME (50B)
- 6 - PERM (60B)
- 24 - ALTER

IF THE VALUE IN PARENTHESES IS USED, THE 2-  
OR 3-LINE SYSTEM MESSAGE WILL APPEAR IN THE  
DAYFILE.

OUTPUT: ERROR RETURN CODE

(EITHER ZPFUNC- OR NOS/BE-GENERATED)

ZPFUNC-GENERATED

IRC MEANING

---

- 1 IRC HAD ILLEGAL INPUT VALUE
- 2 LAST CHARACTER OF AC IS NOT DISPLAY CODE  
NUMERIC

NOS/BE-GENERATED: SEE NEXT PAGE

# NOS/BE-GENERATED

DEC	OCT	COMND	MEANING
0	000	ALL	FUNCTION SUCCESSFUL
1	001		PFN/ID ERROR
2	002	A,P	LFN ALREADY IN USE
3	003	CEPR	UNKNOWN LFN
4	004	C	TOO MANY CYCLES (5 MAX)
5	005	C,E	PF CATALOG FULL
6	006		NO LFN OR PFN
8	010	C,E	LATEST INDEX NOT WRITTEN
9	011	C	FILE NOT ON A PF DEVICE
10	012	A	FILE NOT CATALOGED, SN=<SETNAME>
11	013	A	ARCHIVE RETRIEVAL ABORTED
12	014	C,R	BAD LPF COMMUNICATION
13	015	C	CY LIMIT REACHED (999 MAX)
14	016	C	PF DIRECTORY FULL
15	017	CEPR	FUNCTION ATTEMPTED ON A NON-PERMANENT FILE
16	020		FCN ATTEMPTED ON NON-LOCAL FILE
17	021	A	IMPROPER ARCHIVE RETRIEVAL CALL
18	022	C	FILE NEVER ASSIGN TO A DEVICE
19	023	A	CYCLE INCOMPLETE OR DUMPED
20	024	A	FILE ALREADY ATTACHED
21	025	A	FILE ARCHIVED
22	026		ILLEGAL CHARACTER IN FDB PARAM
23	027		ILLEGAL LFN
24	030	A	FILE DUMPED
25	031		ILLEGAL FUNCTION CODE
26	032	P	PURGE ATTEMPT IGNORED; USE RB PARAMETER
27	033		ALTER NEEDS EXCLUSIVE ACCESS
28	034		FDB IS TOO LARGE
29	035	C	FILE ALREADY IN SYSTEM
30	036	A	NO APF SPACE
31	037		PERMISSION CONFLICTS
32	040		ILLEGAL SETNAME SPECIFIED
33	041		DEVICE NOT MOUNTED AT CTL POINT
34	042		RBT CHAIN TOO LARGE FOR PFC
35	043	A,P	FILE RESIDES ON UNAVAILABLE DEVICE
36	044	A,P	FILE NOT AVAILABLE
56	070		PFM STOPPED BY SYSTEM
* 57	071		INCORRECT PERMISSION
* 58	072		FILE DEFINITION BLOCK ADDRESS INVALID (NOT RETURNED TO FDB)
* 59	073		I/O ERROR ON PFD/PFC READ/WRITE

\* - ALWAYS CAUSES ABNORMAL JOB TERMINATION

IPRMS - PARAMETERS FOR PF FUNCTION  
(UNUSED FIELDS MUST BE SET TO ZERO)

IPRMS	CONTENTS	FUNCTIONS	FORMAT
1	LFN	ALL	1-7 CHAR, LEFT* (IF 0, 1ST 7 CHAR OF PFN ARE USED (A,C,P))
2-5	PFN	A,C,P,R	1-40 CHAR, LEFT
6	ID	A,C,P,R	1-9 CHAR, LEFT
7	TK	**,***	1-9 CHAR, LEFT
8	RD	**,***	1-9 CHAR, LEFT
9	EX	**,***	1-9 CHAR, LEFT
10	MD	**,***	1-9 CHAR, LEFT
11	CN	**,***	1-9 CHAR, LEFT
12	MR	A,C	0 OR NOT
13	AC	C,R****	10 CHAR (LAST 3 NUMERIC)
14	CY	A,C,P,R	INTEGER (1-999) NEGATIVE TO RETURN VALUE
15	RP	C,R	INTEGER (0-999)
16	XR	C,R ***	1-9 CHAR, LEFT
17	LC	A,P	0 OR NOT
18	RW	A,C	0 OR NOT
19	SN	A,P	1-7 CHAR, LEFT
20	VSN		VOLUME SERIAL NUMBER (RESERVED FOR FUTURE)
21	FO	C	2-CHAR, LEFT (DA, IS, AK)
22	ST		STATION ID (MULTI-FRAME) (RESERVED FOR FUTURE)
23	UV	A,P	1-9 CHAR, LEFT
24	RB	P	0 OR NOT

A=ATTACH; C=CATALOG; P=PURGE; R=RENAME

- \* LEFT=LEFT-JUSTIFIED, BLANK OR ZERO PADDED
- \*\* FOR A,P, INTERPRETED AS SUBMITTED PASSWORD
- FOR C, USED AS BOTH DEFINITION AND SUBMITTED PW
- \*\*\* FOR R, WHEN SET TO 1, THE PASSWORD IS CLEARED
- \*\*\*\* FOR C, WHEN OMITTED, AC IS TAKEN FROM CHARGE CARD  
OR LOGIN

NW - NUMBER OF LAST FILLED ELEMENT IN IPRMS (OPTIONAL)

REMARKS  
NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE  
AND SHIFT  
OTHERS

IZPFBTZ  
IZRT9ZR  
NUMVAR  
ZPFMAC  
ZPFPSW

CM REQUIRED: 423B

AUTHOR

C M CHERNICK - DTNSRDC CODE 1832

DATE WRITTEN: 01/75

DATE(S) REVISED

05/75 01/02/76

09/23/80 - DVS - UPGRADE TO LEVEL 508 (ADD UV AND RB)

LANGUAGE: FORTRAN IV EXTENDED

FUNCTIONAL CATEGORIES: Q3

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC



# EXAMPLE

```
PROGRAM TEST (INPUT, OUTPUT,  
A      TAPE5=INPUT, TAPE6=OUTPUT)  
DIMENSION IPRMS(13)  
DATA LFN / 6L MYFILE/  
DATA ID / 4L XXXX/  
DATA IPFN1, IPFN2/ 10H PERMANENTF, 3L LILE/  
DATA IAC / 10H 9876543210/ << SEE NOTE BELOW  
DATA IPW / 8L PASSWORD/  
  
      . . .  
  
DO 10 I=1,13  
10 IPRMS(I) = 0  
   IPRMS( 1) = LFN  
   IPRMS( 2) = IPFN1  
   IPRMS( 3) = IPFN2  
   IPRMS( 6) = ID  
   IPRMS( 7) = IPW  
   IPRMS(13) = IAC << SEE NOTE BELOW  
   IRC = 2  
   CALL ZPFUNC (IRC, IPRMS, 13)  
   IF (IRC .NE. 0) WRITE (6, 20) IRC, IRC  
20 FORMAT ('OERROR - IRC=', O3, 'B = ', I7)  
  
      . . .  
  
STOP  
END
```

THIS PROGRAM IS EQUIVALENT IN EFFECT TO THE FOLLOWING  
CONTROL CARDS:

```
CATALOG(MYFILE,PERMANENTFILE,ID=XXXX,AC=9876543210,  
PW=PASSWORD)
```

FOR A NEW CYCLE OF AN EXISTING FILE; OR

```
CATALOG(MYFILE,PERMANENTFILE,ID=XXXX,AC=9876543210,  
TK=PASSWORD)
```

FOR THE CREATION OF A NEW FILE.

NOTE: IF THESE TWO LINES ARE OMITTED (THAT IS, AC IS  
ZERO), AC WILL BE TAKEN FROM THE BATCH CHARGE CARD  
OR THE INTERCOM LOGIN.

# SUBROUTINE 'ZRTPUT'

## PURPOSE

PUT USER-SPECIFIED PARAMETERS INTO ARRAY FOR LATER CALL TO ROUTE

## FUNCTIONAL CATEGORIES: Q0

## USAGE

```
CALL ZRTPUT (IPRMS, NW)
CALL ZRTPUT (IPRMS, NW, LFN, DC, TID, FID, DEF, RETJOB, FC,
            EC, IC, STID, PRI, REP)
```

## FOR EXAMPLE:

```
CALL ZRTPUT (IPRMS, 0)
CALL ZRTPUT (IPRMS, 1, LFN)
CALL ZRTPUT (IPRMS, 2, LFN, DC)

CALL ZRTPUT (IPRMS, 13, LFN, DC, TID, FID, DEF, RETJOB, FC,
            EC, IC, STID, PRI, REP, NCD)
```

## DESCRIPTION OF PARAMETERS

```
IPRMS - ARRAY (MAXIMUM REQUIRED DIMENSION 13) TO BE DEFINED
NW    - 0 - SET ALL 13 WORDS TO ZERO
      1 THRU 12 - DEFINE NW PARAMETERS FROM THE FOLLOWING
LFN   - LOCAL FILE NAME (1-7 CHARACTERS)
DC    - DISPOSITION CODE (2 CHARACTERS)
TID   - TERMINAL IDENTIFICATION
      1LC - CENTRAL SITE
      2-CHARACTER TERMINAL ID
      4LHERE - ROUTE TO THIS TERMINAL
FID   - FILE IDENTIFICATION
      1L* -OR-
      1-5 CHARACTER FILE ID, PRECEDED BY *
DEF   - 3LDEF - DEFER ROUTE UNTIL END OF JOB
RETJOB - NON-ZERO TO RETURN JOB NAME IN THIS WORD
FC    - FORMS CODE (2 CHARACTERS)
EC    - EXTERNAL CHARACTERISTICS
      FOR PRINT:
      2LB4, 2LB6, 2LA6, 2LA9
      FOR PUNCH:
      2LSB, 5L80COL, 3L026, 3L029, 5LASCII
IC    - INTERNAL CHARACTERISTICS
      0 OR 3LDIS - DISPLAY CODE
      5LASCII   - ASCII
      3LBIN    - BINARY
STID  - 3-CHARACTER STATION ID
PRI   - PRIORITY (TO ROUTING TERMINAL ONLY)
      (0000B-7777B)
      ALL OTHERS USE 0
REP   - REPEAT COUNT (0-31 (37B))
NCD   - 0 -OR-
      1 - NO COMPLEMENTARY DAYFILE
      (VALID ONLY IF IPRMS(5)=3LDEF)
```

NOTE: ALL VARIABLES ARE TYPE INTEGER. CHARACTER DATA IS LEFT-JUSTIFIED AND ZERO-PADDED. TO CLEAR (OR OMIT) A SPECIFIC PARAMETER, USE 0.

REMARKS  
NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED  
PART OF LANGUAGE  
MINO MOVLEV  
OTHERS  
NONE

LANGUAGE: FORTRAN IV EXTENDED

CM REQUIRED: 102B

AUTHOR  
DAVID V SOMMER - DTNSRDC CODE 1892.2

DATA WRITTEN: 01/19/76

DATE(S) REVISED  
01/24/77 - ADD REP PARAMETER  
11/30/77 - ADD NCD PARAMETER

LOCATION OF DECKS  
SOURCE  
UPDATE LIBRARY: NSRDCPL.ID=CSYS  
OBJECT  
EDITLIB USER LIBRARY: NSRDC

SUBROUTINE 'ZSYSEQ'

PURPOSE

FORTRAN CALLABLE SYSTEM CALL

FUNCTIONAL CATEGORIES: Q3

USAGE

CALL ZSYSEQ (I)

DESCRIPTION OF PARAMETER

I - THE CONTENTS OF I ARE PUT INTO X6 BEFORE THE SYSTEM  
IS CALLED

EXAMPLE

CALL SYSTEM ROUTINE DSP WITH PARAMETERS CONTAINED IN 'A':

CALL ZSYSEQ (4LDSPP .OR. LOCF(A))

NOTE: THE P AFTER DSP IS THE RECALL BIT. IF NO RECALL  
REQUIRED, THEN:

CALL ZSYSEQ (3LDSP .OR. LOCF(A))

REMARKS

NONE

SUBROUTINE AND FUNCTION SUBPROGRAMS REQUIRED

PART OF LANGUAGE

NONE

OTHERS

SYS=

LANGUAGE: CDC 6000 COMPASS

CM REQUIRED: 4B

AUTHOR

C M CHERNICK - DTNSRDC CODE 1832

DATE WRITTEN: 04/07/75

DATE(S) REVISED

LOCATION OF DECKS

SOURCE

UPDATE LIBRARY: NSRDCPL,ID=CSYS

OBJECT

EDITLIB USER LIBRARY: NSRDC

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9-8